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INTRASYSTEM ELECTROMAGNETIC COMPATIBILITY ANALYSIS PROGRAM. VOLUME III. COMPUTER PROGRAM DOCUMENTATION

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McDonnell Aircraft Company

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This report documents the programming details of IEMCAP. It contains detailed descriptions of all subroutines, variables, and constants used in the program.

IEMCAP is a USA Standard FORTRAN program for computer-aided implementation of electromagnetic compatibility (EMC) at all stages of an Air Force system's life cycle, applicable to aircraft systems, spacecraft and missile

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20. ABSTRACT (continued)

systems, and ground-based systems. Extensive knowledge of computers is not required to use the program, and all inputs are in easy-to-use, free-field format.

The program incorporates analytical math models to perform four analysis tasks: generation of EMC specification limits tailored to a specific system, analysis for granting waivers to the specifications, survey of the system for interference, and comparative analysis to aid in trade-off decisions. Math models are included covering a large number of source signal waveforms and RF modulation types, receptor types, and transfer modes between sources and receptors. Models are also included for effects of environmental electromagnetic fields.

PREFACE

This documents work conducted by McDonnell Aircraft Company, St. Louis, Missouri, on the Intrasystem Electromagnetic Compatibility (EMC) Analysis Program, sponsored by Rome Air Development Center, Griffiss Air Force Base, New York, under Contract F30602-72-C-0277, Job Order 45400127, from 19 May 1972 to 19 November 1973. Mr. James C. Brodock (RBCT) was the RADC Project Engineer.

This volume contains detailed descriptions of all subroutines, variables and constants used in the program. Volume IV contains complete FORTRAN source listings and detailed flow charts. Volume I contains descriptions of the program, its organization, analytic basis, operating principles, and logic flow. Volume II contains instructions for preparing the input data, running the program and interpreting the resulting output.

Information on these documents and on how to obtain a magnetic tape listing of the program may be obtained from Mr. Brodock, RADC/RBCT, Griffiss AFB, NY 13441.

This report has been reviewed by the RADC Information Office (OI) and is releasable to the National Technical Information Service (NTIS). At NTIS it will be available to the general public, including foreign nations.

This technical report has been reviewed and approved for publication.

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Section 1

INTRODUCTION

This is the computer program documentation of the Intrasystem Electromagnetic Compatibility Program (IEMCAP), which is designed to perform electromagnetic compatibility analyses of ground, aircraft, spacecraft and missile systems. It describes the overall computer program, including its overall logical structure. Descriptions of all routines are given with definitions of all variables used by the routines. Detailed flow charts and source listing are provided in Supplement I to this document.

Due to the potentially large amounts of IEMCAP data, a number of files are used to minimize core requirements, to provide for more efficient processing, and to establish and maintain a data base defining the system. Details of these files are discussed. The computer core requirements for running the program are provided. General instructions for the installation and operation of the program are also provided, as well as a description of program detectable errors.

The IEMCAP math models are in modular form so that when new or improved models become available they can be incorporated into the program with a minimum of difficulty.

For a detailed description of how to perform an electromagnetic compatibility analysis with the IEMCAP program, the user should refer to the IEMCAP User's Manual.

Section 2

PROGRAM DESCRIPTION

2.1 PROGRAM STRUCTURE

The program IEMCAP is an EMC analysis tool and is meant to be used by an engineer with a background in electronics and EMC principles but with minimal computer experience. With this in mind, the program accepts input data in free-field, engineer-oriented format, the data being obtainable directly from system or subsystem operational specifications or from measurements.

The program has the flexibility to analyze a variety of EMC problems and is designed so that new models can be incorporated as they become available. This is made possible by constructing the program as a set of independent, functional modules that are used when needed by the central routine. Each module consists of a subroutine or group of subroutines that can be modified or updated with a minimum of perturbation to the remainder of the program.

IEMCAP is designed to be used on a general purpose digital computer and to be essentially independent of the particular machine and operating system, although there are minimum hardware and central core requirements, as given in Section 3. In order to be as machine-independent as possible, IEMCAP is written in USA Standard Fortran. It consists of two independent, consecutive Fortran programs; the first program, Input Decode and Initial Processing Routine (IDIPR), reads, decodes, and processes the input data, creating the input files for the second program, Task Analysis Routine (TART), which performs the EMC analysis. Descriptions of the major tasks performed by IDIPR and TART are given in Section 2.2 and Section 2.3, respectively.

Both IDIPR and TART are very large and complex programs. IDIPR has 42 subroutines, TART has 57 subroutines and both programs access at least ten separate data files on tape or disk. A detailed description of IEMCAP is given in Section 5, where TART and IDIPR are broken down by subroutine. A hierarchy diagram showing the subroutine hierarchy and calling relationships is given in that section for IDIPR (Figure 4) and for TART (Figure 5). These diagrams, along with a separate description of each subroutine, provide a more comprehensive picture of the role of each subroutine in the dynamics of the program.

Detailed machine-generated flow charts for IDIPR and TART are provided in Supplement I. In addition, detailed narratives of the IDIPR and TART functional flow are given in the IEMCAP User's Manual, along with middle-level flow charts.

2.2 INPUT DECODE AND INITIAL PROCESSING ROUTINE

The computer program IDIPR consists of an input decode routine, an initial processing routine, and a wire map routine. It begins by calling the input decode routine[1] to read and decode the input data. (Superscripts refer to the IDIPR logic flow diagram, Figure 1. Functional routines are referenced by numbers and data files are referenced by letters.)

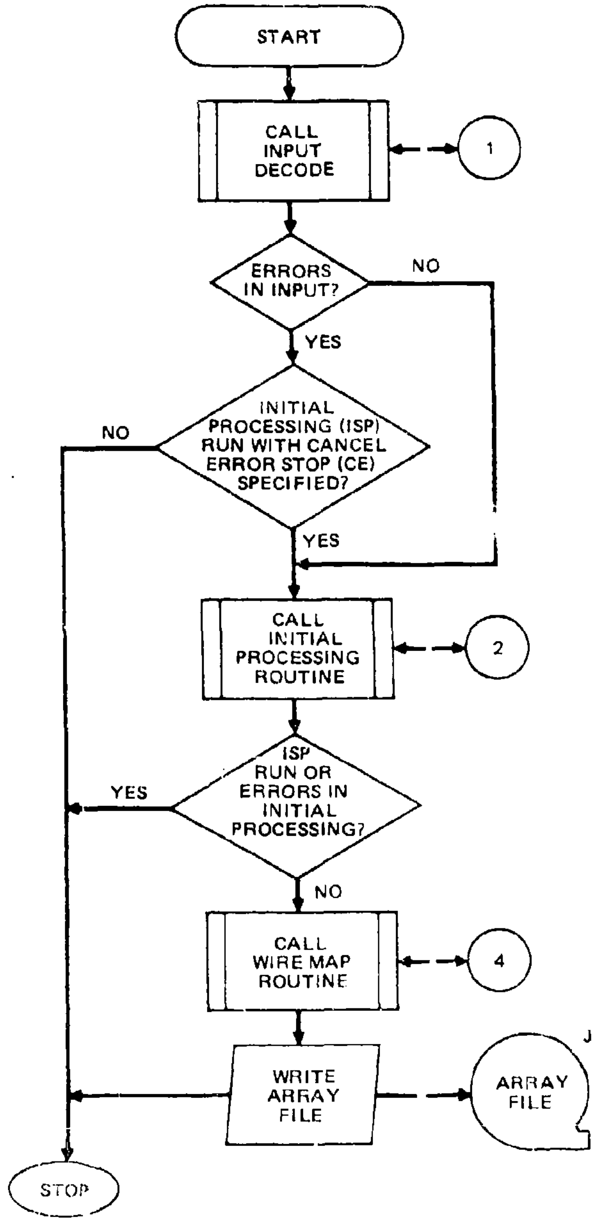

FIGURE 1
IDIPR SECTION OF IEMCAP TOP LEVEL FUNCTIONAL FLOW
(Part 1 of 2)

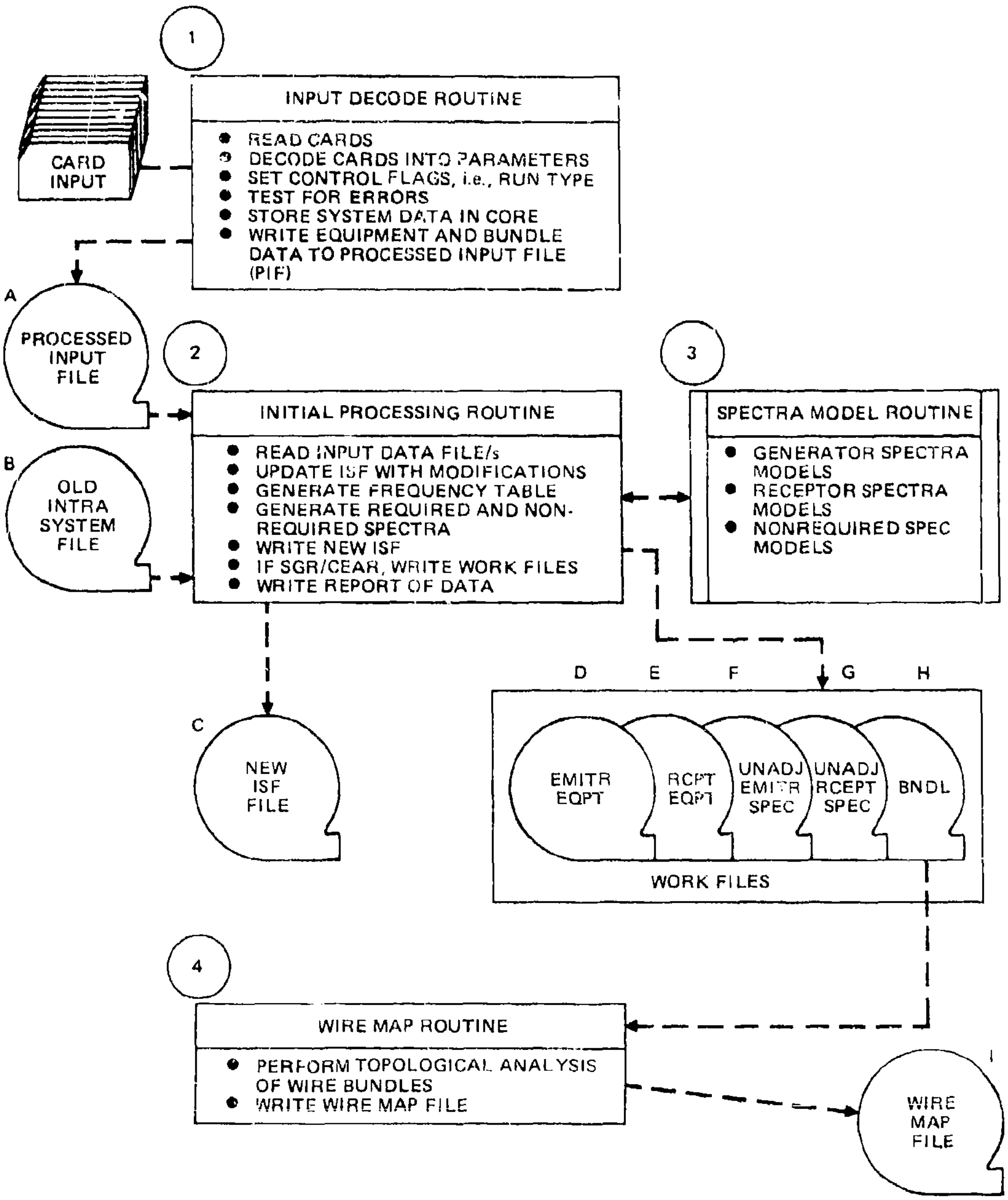

FIGURE 1 (Concluded)
IDIPR SECTION OF IEMCAP TOP LEVEL FUNCTIONAL FLOW
(Part 2 of 2)

The major subroutine in the input decode routine is CARDIN, which calls the auxiliary subroutines as required. Error messages are printed out if errors are encountered in the input data, but the decoding process continues. After the data is decoded, it is written onto the processed input file (PIF)[A].

If there are no input errors, IDIPR then calls the initial processing routine[2] to create an intrasystem signature file (ISF)[C]. The only difference between the PIF file and the ISF file is that the ISF file contains the spectrum data.

The driver for the initial processing routine is the subroutine MERGE. If there is an old ISF file, then spectrum data need be generated only for that part of the system that is to be modified, as read from the PIF file[A], and merged with the old ISF file[B] to create the new ISF file[C]. If there is no old ISF file, then an ISF file is created directly from the PIF file. In either case, spectrum data must be generated. This is done by the subroutine SPCMDL which calls the spectrum model subroutines. If a TART analysis is to be made, MERGE creates the following working files: emitter equipment file[D], receptor equipment file[E], unadjusted emitter spectrum file[F] and unadjusted receptor spectrum file[G]. These working files contain data required as input to the TART program, but are not saved once the TART analysis is completed.

IDIPR then calls the wire map routine[4] to analyze wire bundle data. The major subroutine is MAP, which reads the wire bundle file[H] and performs a topological analysis to determine wire geometry and create the wire map file[I] required by TART to analyze wire coupling modes.

Finally, IDIPR writes the array file[J] containing modify codes, waiver analysis data and other arrays required by TART.

2.3 TASK ANALYSIS ROUTINE

The computer program TART reads the tape or disk files created by IDIPR and performs an electromagnetic compatibility analysis task as specified by the user. Specification generation is performed by the specification generation routine (SGR) and comparative analysis tasks are performed by the comparative EMI analysis routine (CEAR).

2.3.1 Specification Generation Routine

The SGR routine adjusts the initial non-required emission and susceptibility spectra such that the system is compatible. A user-specified adjustment limit prevents too stringent adjustments, and a summary of interference situations that are not resolvable within this adjustment limit is printed. The adjusted spectra are the maximum emission and minimum susceptibility specification for use in EMC tests.

The main subroutine in the spectrum generation routine is SGR. SGR selects emitter-receptor combinations from the emitter equipment file[D] and receptor equipment file[E], and calls the coupling path routine[1] to calculate the electromagnetic coupling, if any, between the emitter and receptor. (Here, superscripts refer to the TART logical flow diagram, Figure 2.) The driver for the coupling path routine is the subroutine COUPLE, which calls the subroutine corresponding to the coupling mode: ACTFER for antenna-to-antenna and antenna-to-wire coupling, WTWTFR for wire-to-wire coupling, and CTCTFR for case-to-case coupling. For antenna-to-antenna or wire-to-wire coupling, COUPLE first reads wire map data from the wire map file[I].

After calling COUPLE, SGR calls EMCASA, which calculates the interference coupled from the emitter to the receptor by multiplying the emission spectrum from the unadjusted emitter spectrum file[F] by the coupling factor, and compares the interference with the receptor susceptibility from the unadjusted receptor spectrum file[G]. If the interference exceeds the receptor susceptibility (positive EMI margin), the emission spectrum is adjusted to the amount needed for compatibility and written onto an adjusted emitter spectrum file. All emitters coupling into a given receptor are so adjusted, then the receptor spectrum is itself adjusted, if necessary, and written onto the adjusted receptor spectrum file. The same procedure is repeated for each of the remaining receptors. During this procedure, the EMI margin and transfer data are written on the baseline transfer file (BTF)[K] for future use by CEAR. Then SGR calls the subroutine WRAPUP to generate a new ISF file[L] from the final adjusted spectra and print a summary of the new ISF file.

2.3.2 Comparative EMI Analysis Routine

The driver for the comparative EMI analysis routine is the subroutine CEAR. CEAR may be run with one of the following options:

(a) Baseline System EMC Survey

This task option surveys the system for interference. If the maximum of the EMI margin over the frequency range for a coupled emitter-receptor pair exceeds the user-specified printout limit, a summary of the interference is printed. Total received signal into each receptor, calculated by the subroutine TORS, is also printed. The analysis results are written on the BTF file[K] for subsequent runs.

(b) Trade-off Analysis

This task option compares the interference for a modified system to that stored on the BTF file from a previous specification generation or baseline system EMC survey run. The interference for the modified system is calculated in the same manner as in the SGR routine. In this way, the effect on interference of antenna changes, filter changes, spectrum parameter changes, wire changes, etc., can be assessed.

(c) Specification Waiver Analysis

This task option shifts portions of specific emitter and receptor spectra and compares the resulting interference to that stored on the BTF file. Thus the effect of granting waivers for specific emitter and receptor specifications can be assessed.

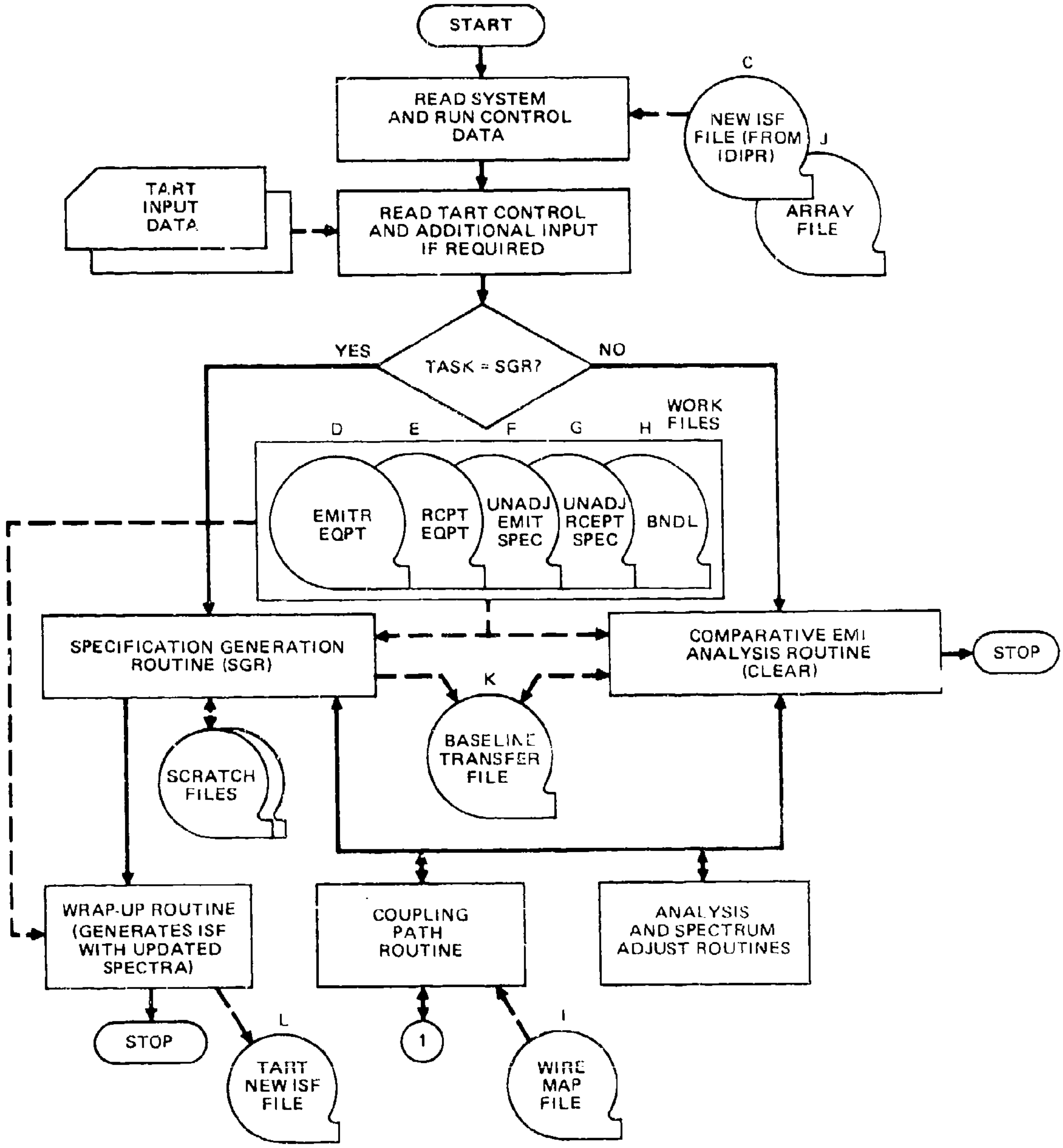

FIGURE 2
TART SECTION OF IEMCAP TOP LEVEL FUNCTIONAL FLOW
(Part 1 of 2)

GP73 1075 25

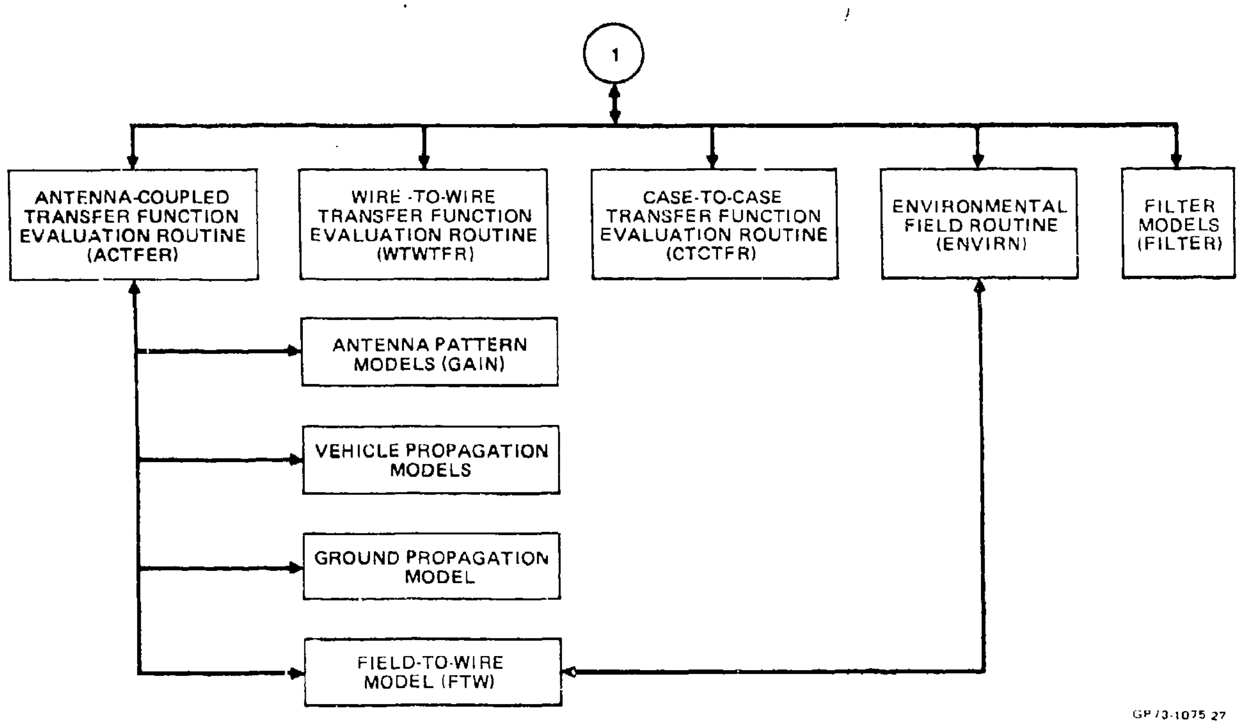

FIGURE 2 (Concluded)
TART SECTION OF IEMCAP TOP LEVEL FUNCTIONAL FLOW
(Part 2 of 2)

Section 3

COMPUTER SYSTEM REQUIREMENTS

3.1 HARDWARE REQUIREMENTS

The hardware requirements for IEMCAP include a computer with at least 67K words available for processing in the Central Processing Unit (CPU), a card reader or timeshare input system, a printer, and file space for the temporary and the permanent files used by IEMCAP. Because of the number of files, disks are recommended, with tapes or disks used to save certain of the permanent files (ISF). A diagram of the necessary components is given in Figure 3.

3.2 COMPUTER CORE REQUIREMENTS

Core requirements to load and execute each of the two parts of IEMCAP on a CDC 6600 are given below. This includes storage for all data that must be in core at any one time and buffer area storages of 1K octal per file.

IEMCAP

IDIPR (Input Decode and Initial Processing Routine) 64K words (decimal)

TART (Task Analysis Routine) 67K words (decimal)

Additional disk space is needed for storage of the data during processing. This varies with the size of the data case. Table 1 gives examples of the file sizes for sample data cases as an aid in estimating disk file storage. The old and new Intrasystem Files may be saved on tape or disk. The remaining files are needed for the duration of the two IEMCAP programs and may optionally be saved after a run.

The times required will vary with the configuration. IDIPR times are essentially a function of the number of input cards only and processing time is approximately .1 sec/card. TART times, however, increase as the square of the number of coupled port pairs.

3.3 ORIGINAL SYSTEM

IEMCAP was developed on a Control Data (CDC) 6600 computer operating under the KRONOS operating system. The CDC 6600 computer is a large scale, multi-programmed, multiprocessing digital computing system. It has one central processor, which performs high speed arithmetic computations, and ten peripheral processors, which perform all input/output operations.

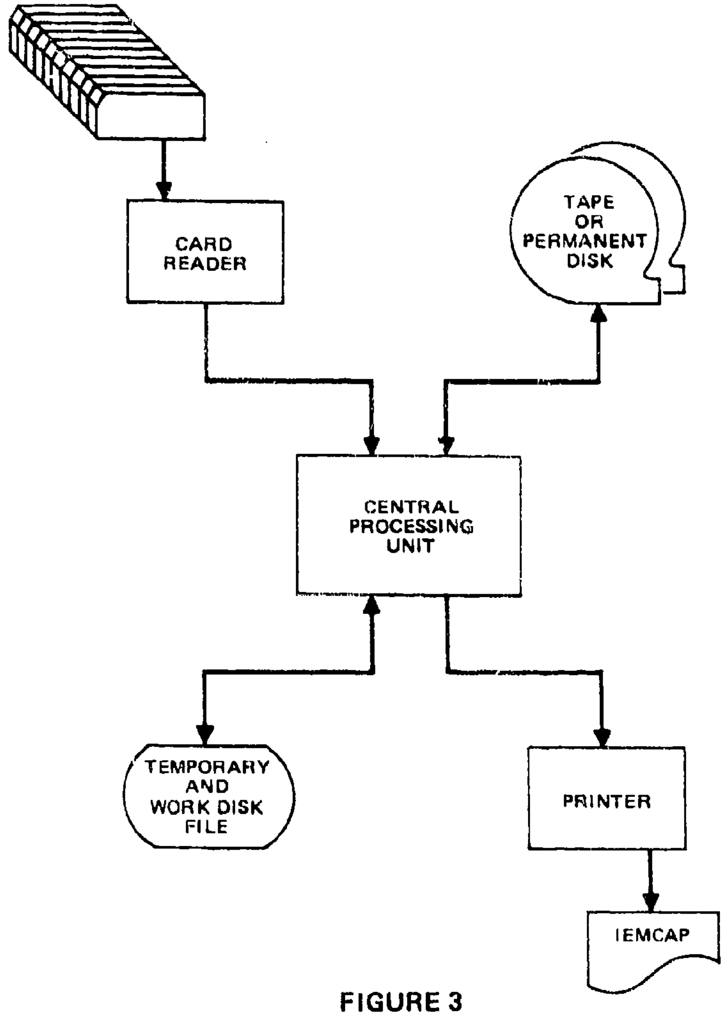

FIGURE 3
IEMCAP COMPUTER RESOURCES

TABLE 1

EXECUTION TIMES AND FILE SIZES ON SAMPLE RUNS

	CASE 1	CASE 2
DATA CASE SIZE		
Total No. Cards Input to IDIPR	170	241
Total No. Ports	33	56
EXECUTION TIMES		
Execution time IDIPR	17.4 sec	24.5 sec
Execution time TART-SGR	176 sec	3 min
FILE SIZE IN WORDS (Decimal)		
PIF	3000	4200
Old ISF	-	-
New ISF	10862	16000
Emitter Spec Work	3012	4200
Receptor Spec Work	1792	2670
Emitter Equip Work	1634	2350
Receptor Equip Work	1631	2380
Bundle	97	400
Map	640	2390
Array	183	300
Transfer File	35000	41000

NOTE: All figures are based on executions on a CDC 6600

IEMCAP has additionally been implemented under the SCOPE operating system, Version 3. It has been compiled using both the CDC FORTRAN IV Version 2.3 compiler and the CDC FORTRAN extended compiler (6000 Version 3/7000 Version 1). It has also been implemented on a Honeywell GE 635 computer, using the extended FORTRAN compiler.

IEMCAP requires no special additional software.

3.4 SUGGESTIONS FOR SYSTEM CONVERSION

Conversion is easily implemented. IEMCAP is written entirely in USA Standard FORTRAN. Aside from minor differences in FORTRAN compilers, the only areas that might be especially noted are the following:

1. In IEMCAP, logical units for system input and output are set at 5 and 6 respectively. These may vary at different installations.

2. IEMCAP uses a number of files during processing. If an installation requires any FORTRAN statements other than the job control statements, such as the CDC Program card, these would need to be supplied.

3. On a 32-bit/word computer, which would have a maximum integer value of $2^{31} - 1$ or 2,147,483,647, the alphanumeric identification (ID) could not begin with the letters V, W, X, Y, Z. Otherwise the numeric code for the 5 character ID would exceed this maximum integer value. The alphanumeric ID ZORK1, for example, would correspond to a numeric code 2,615,181,127. The algorithm to convert an alphanumeric ID into a numeric code is given in Section 5.1.6.

Section 4

PROGRAM INSTALLATION AND OPERATING INSTRUCTIONS

Recognizing that there are alternate methods of implementation for computer program such as IEMCAP, this section describes one way the program can be implemented, from which the user can adapt variations to fit his installations and needs.

4.1 STORING THE SOURCE PROGRAM

IEMCAP is composed of approximately 16000 source statements: approximately 9000 for IDIPR, 7000 for TART. Hence, it is recommended that the program be stored in a source file library on disk to avoid submitting the boxes of cards each time. The details of doing this will vary with different installations. Each of the two executable programs of IEMCAP, IDIPR and TART, should be stored separately so they can each be accessed separately for compilation and execution. It is not absolutely necessary to store the source program, but merely a convenience especially if any updating to the source is done. An alternative to storing the source if no updating is done is to store only a binary output as discussed below.

4.2 COMPILING THE PROGRAM AND STORING THE BINARY OUTPUT

Each of the source programs, IDIPR and TART is next compiled using a USA Standard FORTRAN compiler. The binary output for IDIPR and TART is also saved, and it is these binary files that are loaded and executed to avoid recompiling the 'OO routines that comprise IEMCAP.

Either binary relocatable object modules for each subroutine or one binary load module for IDIPR and one for TART could be saved. If the user has all compilation incompatibilities removed, the later method, saving one binary load file for IDIPR and one for TART, would allow execution of IDIPR with a minimum of system overhead.

The details of obtaining the load modules and the methods of storing them as well as the form (disk, tape, card) will vary at different installations and the user should familiarize himself with the methods used at his installation.

4.3 EXECUTING THE PROGRAM

The binary file saved is loaded and executed by the job control commands of the particular computer system used. IEMCAP can be executed as two separate jobs at different times, or it may be set up to execute as two job steps of a single execution. It is expected that the user will find occasions during the stages of an analysis task to want separate executions as well as occasions when running as a single job will be expedient.

If the user wishes to minimize changing of the deck setup at the expense of possible redundant processing, he may use one job setup for all IEMCAP executions. This job would have two job steps, IDIPR and TART, with the data files passed from one job step to the next and only the permanent files (Intrasystem File and Baseline Transfer File) saved at the end. Error exits to bypass step two in the event of an abnormal termination in step one should be provided. If this method is used, it should be noted that step one would have to be re-done in the event of an abnormal termination in step 2. Although the user could use the ISF as input to IDIPR, and thereby bypass the input decode portion of IDIPR, the intermediate files would have to be regenerated, and hence would necessitate reprocessing that would not be needed if the job were run in two steps and intermediate files saved. Detailed information on job setups for IEMCAP executions can be found in the IEMCAP User's Manual.

4.4 DEFINING DATA SETS

The job control statements that are required by the specific computer to describe the data sets must be supplied for each run. Again, there is no standard way to do this, and the files that are used will vary with the nature of the task and the job status. A list and description of the files needed for each of the IEMCAP programs is given in Table 144. The user must supply the necessary job control statements to describe the files that are used by a specific run. Although the files actually needed vary with different tasks, it is possible for the user to define the maximum files needed for a run and then not vary his data setup cards for different runs. This will eliminate the necessity of changing the data setup at the expense of the extra core used to define files that are not actually needed. If permanent disk files or a dedicated disk is available, the files should be stored there with the necessary job control provided to the system to use the proper files. If permanent disk space is not available to store the files between runs, the data files could be copied to tape at the end of a run by a system utility program and then copied to disk at the start of the next run. If a two separate job execution is used, files denoted intermediate should be saved, in addition to permanent files, for input to TART. If IEMCAP is run as one job with two executions, only permanent files would be saved.

4.5 PROVIDING FOR OUTPUTS

The outputs for IEMCAP will be printed reports and permanent files. Printed output is routed to the system output unit and should require no additional user specification. Steps need to be taken to save the permanent files, by whatever method is used, such as specifying the ID of a dedicated disk pack or label of a tape, as well as providing the job control statements to save the permanent files. Sample outputs and descriptions can be found in the User's Manual.

4.6 PROVIDING FOR ABNORMAL TERMINATION

Because IEMCAP generates a number of files that can be saved upon abnormal termination as well as provisions to use these files to avoid reprocessing, the user should provide job control to save the files in case of an abnormal termination. Information on restarting a job after an abnormal abort is discussed in the User's Manual.

4.7 OPERATING INSTRUCTIONS

IEMCAP requires no special operator intervention during execution other than that which would be used at a particular installation to submit and execute FORTRAN program with files. The only instructions that would be needed would be those necessary to identify the physical devices (tapes, disks) such as:

1. If a special disk pack is used for either the program or files, the identification would need to be given by an installation form or by a job control statement.

2. If tapes are used, tape identification must likewise be supplied on a form or through job control commands. As IEMCAP operates independent of any particular tape requirements, such as tracks or density, whatever is normal to the installation can be used.

3. If permanent system disk files are used, provisions to use space may need to be made with system personnel prior to running to assign file space to the user.

Section 5

IEMCAP SUBROUTINES

Subroutines used in the Input Decode and Initial Processing Routine and the Task Analysis Routine are described in this section. The common blocks used by each routine are referenced and all calling arguments are defined. A dictionary for all local variables is also provided.

Much of the input data is stored in dimensioned arrays which are common to many different subroutines. These arrays are not repeated for each subroutine but are given in the form of tables which cover the entire program.

5.1 IDIPR SUBROUTINES

This section describes all the subroutines that make up the Input Decode and Initial Processing Routine. A hierarchy diagram indicating the levels and calling relationships is given in Figure 4.

5.1.1 Name: IDIPR

DESCRIPTION

IDIPR is the main program for the Input Decode and Initial Processing Section of IEMCAP. It calls CARDIN, MERGE and MAP, the three major subprograms. Additionally, it reports on the input/output units, program options and errors found. The ARRAY file is also written from IDIPR.

DATA REQUIREMENTS

ARGUMENTS:

none

COMMON BLOCKS:

FLAG, ERR, IOUNIT, IOUWK, INDX, IOUSCF, CEARV, SYS2, RCDI, ISF, REINIT,

FSDTA, XYZ, TITLE, MBUG

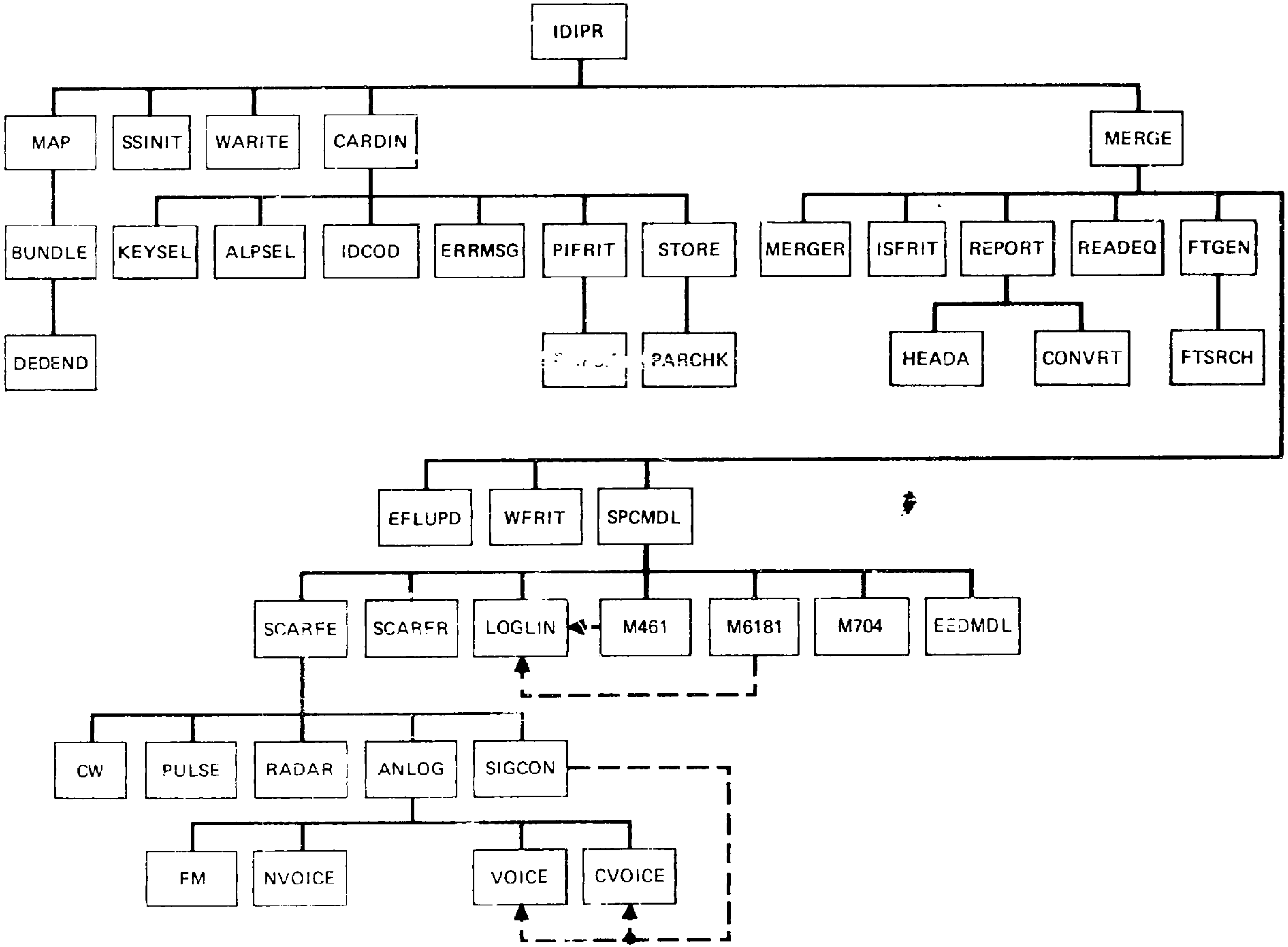

FIGURE 4
IDIPR SUBROUTINE HIERARCHY

TABLE 2

IDIPR MAIN VARIABLES

PROGRAM NAME	DEFINITION
I	DO LOOP INDEX
IA	INDEX FOR PRINTING HOLLERITH FOR SUPPLEMENTAL PRINTOUT OPTION
ICLASS	ARRAY OF HOLLERITH CLASSIFICATION CODES
IE	DO LOOP INDEX
IOSAV	SAVES LOGICAL UNIT OF OLD ISF TO ALLOW SWITCHING UNITS OLD AND NEW FOR RECYCLING THROUGH IDIPR
IR	INDEX FOR PRINTING CEAR SUB-TASKS
IR3	TERMINAL INDEX FOR PRINTING CEAR SUB-TASKS
ITSK	HOLLERITH FOR CEAR SUB-TASK OPTIONS
ITXX	LOGICAL UNIT ASSIGNMENT FOR ARRAY FILE
IW	DO LOOP INDEX
I1	INDEX TO PRINT HOLLERITH FOR NEW REPORT OPTION
I2	INDEX TO PRINT HOLLERITH FOR OLD REPORT OPTION
I3	INDEX TO PRINT HOLLERITH FOR ISF FILE OPTION
J	DO LOOP INDEX
JO	INDEX FOR PRINTING HOLLERITH FOR JOB STATUS OPTION
JOB	HOLLERITH FOR JOB STATUS OPTIONS
[illegible]	INDEX
N	ARRAY OF HOLLERITH CHARACTERS TO PRINT "IEMCAP"
NAME	HOLLERITH NAMES FOR EXECUTE OPTIONS CHARACTERS
NOYA	HOLLERITH CHARACTERS "NO" OR "YES"
NP	NUMBER OF PORTS PER EQUIPMENT

5.1.2 Name: ALPSEL

DESCRIPTION

This routine compares the alphanumeric code words to the keyword list and assigns a numeric value to them or returns an error flag. A list of alphanumeric code words and their numeric codes is given in Section 5.2, Table 60.

DATA REQUIREMENTS

ARGUMENTS:

none

COMMON BLOCKS:

ERR, KEYS, FSDTA, NKCP, FFDTA, IOUNIT, ALPS, KEYWD

TABLE 3

ALPSEL VARIABLES

PROGRAM NAME	DEFINITION
I	DO LOOP INDEX
IDEE	THE LETTER "D"
IJ	DO LOOP INDEX
IS	STARTING INDEX IN ARRAY OF ALPHA CODES WHERE SEARCH FOR AN ALPHA CODE IS TO BEGIN
ITIME	FLAG TO SIGNAL SECOND PASS SEARCH FOR ANTENNA DATA
ITYP	SR CODE FOR SOURCE/RECEPTOR CARD
KK	INDEX OF COLUMN IN ARRAY DATA WHERE ALPHA CODE WORD IS FOUND
NINC	NUMBER OF CHARACTERS IN ALPHA CODES TO BE SEARCHED. IT IS A CONSTANT EQUAL TO 2.
NP	NUMBER OF ALPHA CODES ASSOCIATED WITH A KEYWORD, AND HENCE THE NUMBER TO BE SEARCHED IN LOCATING AN ALPHA CODE

5.1.3 Name: BLOCK DATA

DESCRIPTION

BLOCK DATA contains the data definitions used for keywords, alphanumeric code words and error messages for IDIPR. Additionally, it makes unit assignments to logical units and initializes various parameters. Strictly speaking, it is not a true subroutine, in that it contains no executable statements and it is not called.

DATA REQUIREMENTS

ARGUMENTS:

none

COMMON BLOCKS:

STIX, MSGERR, NKCP, IOUSCF, ERR, KEYS, INDX, CEARV, IOUNIT, ALPS, MOD,

DUPE, IOUWK, CHAR, FLAG, TITLE, MBUG

VARIABLES:

none

5.1.4 Name: CARDIN

DESCRIPTION

This routine is the main routine during the input decode process. It reads the data cards and decodes them. An equals sign is used to differentiate the keyword from the parameters. A parenthesis left of the equals sign indicates an ISF modification code word. The columns to the right of the equals sign are separated into parameters which are delineated by commas. These parameters are stored in floating point or integer arrays.

During the decoding process, CARDIN calls KEYSEL to assign an integer value to the keyword, ALPSEL to assign integer values to alpha code words, IDCOD to assign a numeric code to identifications, STORE to store the parameters into arrays determined by keyword, PIFRIT to write the data, and SSINIT to initialize arrays.

DATA REQUIREMENTS

ARGUMENTS:

none

COMMON BLOCKS:

FLAG, CHAR, KEYS, CEARV, TITLE, NKCP, FFDTA, ERR, FSDTA, IOUNIT, KEYWD,

MBUG

TABLE 4

CARDIN VARIABLES

PROGRAM NAME	DEFINITION
CARD	ARRAY INTO WHICH EACH INPUT CARD IS READ
CDNB	ARRAY OF THE INPUT CARD WITH BLANKS SUPPRESSED
DATAK	ALPHANUMERIC CHARACTER BEING PROCESSED IN DATA ARRAY
ESIGN	FLAG GIVING THE SIGN OF THE EXPONENT OF A FLOATING POINT
I	DO LOOP INDEX
IBK	ARRAY OF EDIDIC CHARACTER, (BLANK)

TABLE 4 (Continued)

PROGRAM NAME	DEFINITION
ICARD	COUNTER OF INPUT CARDS
ICRD	I^{TH} COLUMN IN ARRAY, CARD
IEFLG	FLAG SET IF A NUMBER PRECEDES "E", INDICATING EXPONENT AND NOT AN ALPHANUMERIC CODE WORD LETTER
IER	ERROR FLAG FOR MATCHING PARENTHESIS ON A CARD
IEXP	INTEGER EXPONENT BUILT IN DECODING AN E-FLOATING TYPE NUMBER
IT	DO LOOP INDEX
IMLT	INDEX USED DURING BUILDING OF A DECIMAL NUMBER
INIT	HOLDS THE INITIAL COLUMN NUMBER FOR THE ERRONEOUS LINE IN THE INPUT SUPERCARD
INP	ABSOLUTE VALUE OF NUMBER OF PARAMETERS ASSOCIATED WITH A KEYWORD
IPAREN	FLAG SET BY A PARENTHESIS USED TO SIGNAL SUBPARAMETERS
IPARM	INDEX FOR COUNTING PARAMETERS
IPLFT	FLAG SET BY "(" AND USED TO DETERMINE MATCHING PARENTHESIS
IS	START OF INDEX OF FILE MODIFICATION WORD IN DATA ARRAY
ISPARM	INDEX FOR COUNTING SUBPARAMETERS
ISTRR	STARTING INDEX IN REMARKS TO STORE NEW REMARKS CARD
ISTRT	STARTING INDEX IN TITLE ARRAY TO TRANSFER NEW TITLE CARD
IS2	INDEX FOR ISF MODIFICATION WORD IN DATA
ITEST	INDEX FOR ELEMENT IN ARRAY OF INTEGERS, NUM
IUPARW	EBIDIC CHARACTER "$"
J	LAST NON-BLANK CHARACTER IN DATA ARRAY AND HENCE THE NUMBER OF CHARACTERS IN DATA

TABLE 4 (Concluded)

PROGRAM NAME	DEFINITION
JE	INDEX FOR TRANSFERRING CDNB TO SUPERCARD, DATA
K	INDEX FOR SEARCHING DATA ARRAY
KDEC	COLUMN IN DATA ARRAY WHERE "." IS FOUND
KENDN	INDEX IN DATA FOR END OF AN EXPONENT
KEXP	NUMBER OF INTEGERS IN THE EXPONENT OF A NUMBER BEING BUILT
KW	COUNTER OF NUMBER OF CHARACTERS PRIOR TO "="
LASTJ	LAST COLUMN IN THE LINE
LASTK	LAST CORRECT COLUMN IN THE LINE
LINES	ONE LINE LESS THAN THE LINES OF THE SUPERCARD, DATA
LINESK	ONE LINE LESS THAN THE NUMBER OF CORRECT LINES IN THE SUPERCARD
NEND	HOLDS LAST COLUMN NUMBER FOR THE ERRONEOUS LINE IN THE SUPERCARD
NP	NUMBER OF PARAMETERS FOR KEYWORD BEING PROCESSED
NSIGN	FLAG SET BY "+" OR "-" IN BUILDING FLOATING POINT NUMBERS
SHIFT	MULTIPLIER FOR BUILDING DECIMAL NUMBERS
TEST	FLOATING REPRESENTATION OF INTEGER FOUND IN BUILDING FLOATING NUMBERS
VALUE	FLOATING NUMBER VALUE BEING BUILT DURING DECODING PROCESS

5.1.5 Name: ERRMSG

DESCRIPTION

This routine prints an error message from a pre-stored list. The number of the message is signified by the value of IERR.

DATA REQUIREMENTS

ARGUMENTS:

none

COMMON BLOCKS:

ERR, MSGERR, IOUNIT

TABLE 5

ERRMSG VARIABLES

PROGRAM NAME	DEFINITION
FATAL	AN ARRAY CONTAINING FATAL ERROR HEADER
FERR	ARRAY CONTAINING FATAL ERROR MESSAGES
I	IMPLICIT DO LOOP INDEX
IX	INDEX FOR PRINTING FATAL ERROR MESSAGE

5.1.6 Name: IDCOD

DESCRIPTION

This routine converts alpha ID's, stored one letter per word in up to 5 words, into a numeric word, and it also converts the numeric code word back into an array of alphanumerics. In converting the 5 word alphanumeric ID to a single numerical value the following association is made:

A to Z are assigned values 1 to 26, respectively
1 to 9 are assigned values 27 to 35, respectively
0 is assigned the value 36

The alphanumeric ID, ABCDE is assigned numerical values, a, b, c, d, and e which are combined into a single value by the following algorithm:
$100000000a + 1000000b + 10000c + 100d + e$

If there are less than 5 characters in the ID, the right-most are considered to be blank, and blank is converted to a numeric value of 0.

Hence, the ID, AB, converts to the following numeric value:
$100000000a + 1000000b$.

DATA REQUIREMENTS

ARGUMENTS:

IENTRY - control flag that signals which type of processing is to be done.

= 1 code alphanumeric to numeric

= 2 decode numeric to alphanumeric

= 3 decode an array of numerics to alphanumeric

COMMON BLOCKS:

ERR, CHAR, FFDTA, IOUNIT

TABLE 6

IDCOD VARIABLES

PROGRAM NAME	DEFINITION
I	DO LOOP INDEX
IDX	NUMERIC CODE WORD BEING DECODED TO ALPHA CHARACTERS
IJ	DO LOOP INDEX
IL	INDEX FOR CODE WORD IN SUPERCARD, IATA
IREM	REMAINDER MODULO 100 OF NUMERIC CODE WORD
ITENS	ARRAY OF POWERS OF 100
ITIM	NUMBER OF TIMES A NUMERIC HAS BEEN DECODED. WHEN EQUAL TO NARY, ALL REQUESTED NUMERICS HAVE BEEN DECODED.
J	DO LOOP INDEX
JJ	INDEX
JK	INDEX
K	INDEX
KD	INDEX
KDELTA	NUMBER OF ALPHA CHARACTERS IN ID TO BE CODED, LIMITED TO 5

5.1.7 Name: KEYSEL

DESCRIPTION

This routine compares the columns of the input card which contain the keyword to the keyword list and assigns a numerical value to the keyword if found or returns an error flag if not found. A list of valid keywords is given in Section 5.2, Table 59.

DATA REQUIREMENTS

ARGUMENTS: none

COMMON BLOCKS:

ERR, KEYS, FFDTA, IOUNIT, KEYWD

TABLE 7

KEYSEL VARIABLES

PROGRAM NAME	DEFINITION
I	DO LOOP INDEX
IFIRST	FLAG SIGNALING FIRST CALL TO THIS ROUTINE
ITYP	DO LOOP INDEX
JP	INDEX
NINC	NUMBER OF CHARACTERS IN KEYWORD
NKEYS	NUMBER OF KEYWORDS

5.1.8 Name: PARCHK

DESCRIPTION

This routine checks the number of parameters on the source and receptor cards.

DATA REQUIREMENTS

ARGUMENTS:

ITYPE - control flag telling which type of card entry is being made

(1 = source, 2 = receptor)

COMMON BLOCKS:

ERR, FSDTA, KEYWD

TABLE 8

PARCHK VARIABLES

PROGRAM NAME	DEFINITION
I	INDEX
J	EQUAL TO THE SOURCE/RECEPTOR TYPE CODE
K	INDEX
N	NUMBER OF PARAMETERS ON A SOURCE/RECEPTOR CARD IF TYPE IS CASE
NSCP14	AN ARRAY CONNECTING THE ALPHA CODE OF THE SIGNAL/CONTROL CODE TO THE NUMBERS OF SUBPARAMETERS IN THE FIRST SUB-PARAMETER GROUP
NSP1	NUMBER OF SUBPARAMETERS IN THE FIRST PARENTHESIS GROUP
NSP14	AN ARRAY CONNECTING THE ALPHA CODE OF THE MODULATION/SIGNAL CODE (MODSIG) TO THE NUMBER OF SUBPARAMETERS IN THE FIRST PARENTHESIS GROUP
NSSP14	AN ARRAY CONNECTING THE ALPHA CODE OF THE PTYPE OF A RADAR MODSIG CODE TO THE NUMBER OF SUBPARAMETERS IN THE FIRST PARENTHESIS GROUP

5.1.9 Name: PIFRIT

DESCRIPTION

This routine writes the Processed Input File (PIF). The decoded data is written to the PIF file each time an equipment, a bundle, or an end-of-data card is encountered. System data is written out on the initial call if the job is new.

DATA REQUIREMENTS

ARGUMENTS:

None

COMMON BLOCKS:

FLAG, FSDTA, MOD, ERR, FFDTA, TITLE, XYZ, DUPE, IOUNIT, PID, INDX, MBUG,

KEYWD

TABLE 9

PIFRIT VARIABLES

PROGRAM NAME	DEFINITION
I	DO LOOP INDEX
IA	DO LOOP INDEX
IB	DO LOOP INDEX
IBADD	CONTROL FLAG SET EQUAL TO ONE WHEN THE BEGINNING OF "ADDS" IS REACHED IN BUNDLE DATA
IC	DO LOOP INDEX
ID	DO LOOP INDEX
IDUMO	PLACE HOLDER IN WRITING PIF TYPE SO AS TO KEEP THE SAME FORMAT AS THE ISF FILE
IEND	INDEX SIGNIFYING THE NUMBER OF ELEMENTS IN VARIABLE ARRAYS, SUCH AS FOR FLOATING SOURCE/RECEPTOR ARRAYS
IENDBD	FLAG SET EQUAL TO 999 WHEN END OF BUNDLE DATA IS ENCOUNTERED
IENDEQ	FLAG SET EQUAL TO 999 WHEN END OF EQUIPMENT DATA IS ENCOUNTERED
IFRST	SIGNALS WHEN THE FIRST ENTRY TO THIS ROUTINE IS MADE IN ORDER TO WRITE SYSTEM DATA
IP	PORT INDEX

TABLE 9 (Concluded)

PROGRAM NAME	DEFINITION
IS	INDEX USED AS STARTING LOCATION OF DATA IN VARIABLE ARRAYS SUCH AS SO/RC
ISR	SOURCE/RECEPTOR CODE
ITT	LOGICAL UNIT
ITYP	PORT TYPE
IW	WIRE INDEX
IX	PORT INDEX USED WHEN DELETING A PORT AND COMPRESSING THE DATA
IZ	PORT INDEX USED WHEN DELETING A PORT AND COMPRESSING DATA
J	NUMBER OF ELEMENTS IN BPTCO ARRAY, EQUAL TO 3 TIMES THE NUMBER OF NODE POINTS
K	INDEX
MODSIG	MODULATION/SIGNAL CODE
NP	NUMBER OF PORTS FOR THE EQUIPMENT BEING WRITTEN
NR	NUMBER OF HARMONICS FOR AN RF TYPE
NSP	NUMBER OF SUBPARAMETERS. EQUAL TO ISO(IPRT, 3)
NSP1	NUMBER OF SUBPARAMETERS IN NARROWBAND SPECTRA FOR CASE TYPES
NWS	NUMBER OF BUNDLE SEGMENTS
NSW2	NUMBER OF BUNDLE SEGMENTS TIMES TWO
NSW41	NUMBER OF DATA ELEMENTS IN IBEP ARRAY, EQUAL TO 1 MORE THAN 4 TIMES THE NUMBER OF SEGMENTS IN A BUNDLE

5.1.10 Name: SSINIT

DESCRIPTION

This routine initializes parameters and arrays.

DATA REQUIREMENTS

ARGUMENTS:

IIGO - control variable that tells which type of data initialization is requested

=-1, initialize all variables in commons INDX, MOD, XYZ, PID, and FSDTA and in array ICHG

= 1, initialize equipment, port, source, receptor, data and bundle data

= 2, initialize initial spectra arrays

COMMON BLOCKS:

ERR, IOUNIT, SPECT, INDX, XYZ, TITLE, CEARV, PID, MOD, FSDTA

TABLE 10

SSINIT VARIABLES

PROGRAM NAME	DEFINITION
I	DO LOOP INDEX
J	DO LOOP INDEX
K	DO LOOP INDEX
MXANT	MAXIMUM NUMBER OF ANTENNAS
MXFTR	MAXIMUM NUMBER OF FILTERS
MXPRT	MAXIMUM NUMBER OF PORTS PER EQUIPMENT
MXWR	MAXIMUM NUMBER OF WIRES PER BUNDLE

5.1.11 Name: STORE

DESCRIPTION

This routine stores the parameters found by CARDIN into data arrays determined by the keyword. These arrays are given in Section 5.2. Additionally, STORE performs various error analysis functions, such as checking that the card is in valid order, that the modification code is valid for job type, that the number of parameters is correct for the keyword, that all necessary hierarchy cards precede a lower level hierarchy card, and that maximum counts are not exceeded for a particular type of data.

DATA REQUIREMENTS

ARGUMENTS:

None

COMMON BLOCKS:

FLAG, FSDTA, MOD, ERR, INDX, NKCP, XYZ, CEARV, IOUNIT, PID, REINIT, KEYWD, MBUG

TABLE 11

STORE VARIABLES

PROGRAM NAME	DEFINITION
I	DO LOOP INDEX
ICASE	NUMERIC CODING FOR ALPHANUMERIC ID, CASE
ICOD	FOR POWER PORTS, THE RS CODE ON THE SO/RC CARD. ALSO ANTENNA TYPE CODE
ID	IDENTIFICATION OF A PORT
IEND	ENDING INDEX FOR A VARIABLE NUMBER OF PARAMETERS SUCH AS FOR SO/RC FLOATING POINT PARAMETERS
IGRP	FLAG THAT GROUPS KEYWORDS FOR DETERMINING IF A CARD IS OUT OF ORDER. INITIALLY SET TO 1; IS SET TO 2 BY A SUBSYSTEM AND/OR EQPT AND SET TO 3 BY A BUNDLE CARD
IJ	INDEX
IP	INDEX USED FOR A NUMERIC PARAMETER VALUE. USED AS PORT ID, ALSO FILTER TYPE CODE, MODSIG CODE

TABLE 11 (Continued)

PROGRAM NAME	DEFINITION
IP2	NUMERIC PARAMETER VALUE
IREM	REMAINDER OF A MODULO FUNCTION
IS	INITIAL INDEX FOR VARIABLE NUMBER ARRAYS
ISR	SOURCE/RECEPTOR TYPE CODE
ISSID	NUMERIC CODE VALUE OF SUBSYSTEM ID
IT	NUMBER OF PARAMETERS IN WIRE TABLE ENTRY
J	DO LOOP INDEX
JDELnn (nn is keyword code)	FLAG THAT INDICATES THAT A HIERARCHY CARD WAS DROPPED DUE TO ERROR WHEN EQUAL TO -1. SET TO 0 IF CARD IS GOOD USED FOR: KC EQUALS 10 (SU); KC EQUALS 11 (EQ); KC EQUALS 12 (PO). (SET EQUALS 2 FOR DELETED PORT SO NO SO/RC IS ACCEPTED UNTIL NEW PORT CARD)
K	DO LOOP INDEX
L	DO LOOP INDEX
MODSIG	MODULATION/SIGNAL CODE OF A PORT
MOD10S	STORES SUBSYSTEM MODE CODE TEMPORARILY WHILE PREVIOUS EQUIPMENT IS BEING WRITTEN OUT UNTIL NEW EQUIPMENT IS ENCOUNTERED
MSR	FLAG THAT TELLS IF SO/RC OR BOTH ARE PRESENT FOR A PORT NUMBER OF PARAMETERS EXPECTED FOR A WIRE ENTRY BASED ON TYPE
NP12	NUMBER OF PORT PARAMETERS BY TYPE
NP21	NUMBER OF WIRE TABLE PARAMETERS
NSP	NUMBER OF SUBPARAMETERS
NSP1	NUMBER OF SUBPARAMETERS IN A FIRST SUBPARAMETER GROUP
NSP12	NUMBER OF SUBPARAMETERS FOR PORT BY TYPE
NSP13	NUMBER OF SUBPARAMETERS FOR FILTER BY TYPE

TABLE 11 (Concluded)

PROGRAM NAME	DEFINITION
NSP14	NUMBER OF SUBPARAMETERS FOR SOURCE BY TYPE
NSP16	NUMBER OF SUBPARAMETERS FOR ANTENNA BY TYPE
NSP2	NUMBER OF SUBPARAMETERS IN A SECOND SUBPARAMETER GROUP
NWS	NUMBER OF WIRE SEGMENTS
NWS2	NUMBER OF WIRE SEGMENTS TIMES 2
NWS4	NUMBER OF WIRE SEGMENTS TIMES 4 PLUS 1, EQUAL TO NUMBER OF ENTRIES IN IBEP ARRAY

5.1.12 Name: MERGE

DESCRIPTION

This routine is the main file management routine during initial processing. It reads the Processed Input File and creates the new ISF file. If the run is a modify run, it performs the modifications to the old ISF file to create the new ISF. It calls the subroutine SPCMDL to generate the initial spectra, using the spectrum models. If a CEAR/SGR run is being made, it creates work files and arrays for CEAR/SGR.

DATA REQUIREMENTS

ARGUMENTS:

None

COMMON BLOCKS:

FLAG, XYZ, INDX, ERR, SPECT, SYS2, PID, MOD, IOUNIT, RCDI, CEARV, STIX,

IOUWK, DUPE, FFDTA, TITLE, ISF, MBUG, REINIT, NWS

TABLE 12

MERGE VARIABLES

PROGRAM NAME	DEFINITION
I	DO LOOP INDEX
IAID	ANTENNA IDENTIFICATION
IBID	BUNDLE ID, PIF FILE
IBID1	BUNDLE ID OF CURRENT BUNDLE
IBID2	BUNDLE ID, ISF FILE
IBSAV	SAVES BUNDLE ID FOR WIRE PORTS
IC	FLAG TELLING WHICH TYPE OF ENVIRONMENTAL FIELD DATA IS TO BE PROCESSED; 1 - OUTER, 2 - INNER
ICASE	CODE WORD FOR "CASE"
ICON	PORT CONNECTION TYPE, EQUAL TO IPPRM2(IP, 2)
ID	IDENTIFICATION, USED FOR SUBSYSTEM, EQUIPMENT AND BUNDLE

TABLE 12 (Continued)

PROGRAM NAME	DEFINITION
IDBP1	ID OF A BUNDLE POINT OF THE CURRENT BUNDLE
IDBP2	ID OF BUNDLE POINT SAVED FOR WIRE PORT
IDD	IDENTIFICATION OF A DELETED BUNDLE
IDEQP	ID OF EQUIPMENT READ FROM PIF
IDEQS	ID OF EQUIPMENT OF SPECTRA RECORD READ FROM ISF
IDIF	DIFFERENTIAL OF MODSPI CODES FOR PORTS WHOSE DATA WAS CHANGED AND THOSE NOT CHANGED
IDIV	DIVISION FACTOR TO CONVERT SUBPARAMETERS TO FREQUENCIES OR FUNCTION POINTS
IDPRTS	ID OF PORT OF SPECTRA RECORD READ FROM ISF
IDSSP	ID OF SUBSYSTEM READ FROM PIF
IDSSS	ID OF SUBSYSTEM OF SPECTRA RECORD READ FROM ISF
IDUM	DUMMY
IEND	INDEX
IENDP	INITIALLY = 0. SET TO 1 WHEN END OF THE PIF FILE IS REACHED FOR EQPT OR BUNDLE. IF NO PIF FILE PRESENT (JOBIS = 0 OR 2), IENDP IS SET TO 1 TO BYPASS PIF READS.
IEND2	INDEX
IEP	INDEX OF EQUIPMENT FOR A WIRE PORT
IEPS	EQUAL TO IEPSAV(I)
IEPSAV	SAVES EQPT (EE) AND PORT (PP) INDEX AND SHIELD (S) CODE IN A PACKED CODED WORD, SEEPP
IGO	FLAG THAT TELLS WHAT TYPE OF PROCESSING IS IN PROGRESS. 1 = ISF ONLY; 2 = PIF ONLY; 3 = MERGING ISF AND PIF
IGOT	CODE, 99999, STORED IN IBSAV ARRAY TO SIGNAL BUNDLE FOUND DURING IPTCPL BUILD
IMAP	FLAG TO TELL ENTRY POINT IN READEQ FOR BUNDLE DATA READING. = 2, READ ALL OF BUNDLE DATA; = 3, READ BUNDLE DATA AT FIRST RECORD AFTER HEADER RECORD

TABLE 12 (Continued)

PROGRAM NAME	DEFINITION
IOSAV	INITIALLY = 1. SAVES ISF LOGICAL UNIT NUMBER WHEN ISF LOGICAL UNIT IS SET TO THAT OF PIF FILE TO READ PIF "ADD'S."
IP	INDEX
IPID	ID OF ANTENNA FOR ANTENNA PORT
IPIFM	FLAG THAT TELLS IF PIF RECORDS ARE TO BE READ DURING MERGING PROCESS. INITIALLY = 1. AFTER AN EQPT IS READ, IT IS SET TO 0 UNTIL A MATCHING OLD ISF EQUIPMENT IS FOUND. THEN IT IS SET TO 1 TO INITIATE A NEW PIF EQPT READ. IT IS SET TO 2 WHEN "ADD'S" ARE REACHED ON PIF AND REMAINS AT 2 UNTIL ALL ISF REMAINING EQUIPMENTS ARE READ. IT IS USED IN A SIMILAR FASHION FOR BUNDLE DATA
IPSAV	SAVES BUNDLE POINT ID OF A WIRE PORT
IREAD	CONTROL FLAG TO TELL READEQ WHICH READ IS REQUESTED -2, READ EQPT. HEADER ONLY -1, READ EQPT. DATA AFTER HEADER 1, READ EQUIPMENT DATA 2, READ BUNDLE DATA 3, READ BUNDLE DATA AFTER HEADER 4, READ SYSTEM DATA
IS	INDEX
ISAV	INTERMEDIATE VALUES IN BUILDING IPTCPL PACKED WORD
ISAVE	SAVES ISF INTEGER EQPT. PARAMETERS
ISBEQD	FLAG SET TO 1 IF EQPT IS BEING DELETED
ISHLD	SHIELD CODE OR SHIELD CODE SHIFTED FOR STORING IN IPTCPL PACKED WORD
ISKIPS	FLAG THAT TELLS IF SPECTRA RECORDS SHOULD BE SKIPPED DURING MERGING PROCESS: = 0-NO SKIP; = 1-SKIP OVER SPECTRA READS FROM ISF

TABLE 12 (Continued)

PROGRAM NAME	DEFINITION
ISP	COUNTER OF NUMBER OF SPECTRA RECORD SETS READ FROM THE ISF
ISPEG	INITIAL SPECTRUM GENERATION REQUEST FLAG: = 1-GENERATES SO SPEC; = 2-GENERATES RC SPECS; = 3-GENERATES BOTH SPECS
ISR	SET EQUAL TO ISO(IP, 6) OR IRO(IP, 6); SR CODE
ITYP	SET EQUAL TO IPPARM(IP, 10), PORT TYPE: 0 = NO SO/RC; 1 = SO; 2 = RC; 3 = BOTH
IW	INDEX
IWB1	BUNDLE INDEX AS READ FROM PIF FILE
IWID1	WIRE ID
IWIR2	WIRE ID
IWSAV	SAVES WIRE ID OF WIRE PORT
IX	INDEX
J	INDEX
JJ	INDEX
K	INDEX
KK	INDEX
MD	SUM OF MOD. CODES OF ENVIRONMENTAL FIELD LEVEL DATA
MODS	MODIFY CODE OF A PORT
MODSIG	MODULATION/SIGNAL CODE
MODSX	ARRAY OF MODIFY CODES THAT TRANSLATES THE MOD CODES OF MODSPM (AND HENCE ICHG) INTO 3 CODES THAT TELL IF NEW INITIAL SPECTRA SHOULD BE GENERATED FOR A PORT. THE RELATIONSHIP OF ICHG AND MODSX IS GIVEN IN TABLE 58.
MS	INTERMEDIATE VALUE FOR MODSPI
M12	PORT MODIFY CODE
M14	SOURCE MODIFY CODE

TABLE 12 (Concluded)

PROGRAM NAME	DEFINITION
M15	RECEPTOR MODIFY CODE
NB	EQUAL TO IBPRM2(3). NUMBER OF BUNDLE POINTS
NDEL13	NUMBER OF FILTERS TO BE DELETED
NE	INDEX FOR STORING SUBSYSTEM ID OF DELETED EQUIPMENT
NED2	2 TIMES THE NUMBER OF DELETES GIVING NUMBER ENTRIES IN IDEQD
NEWFQ	FLAG SET TO INDICATE IF NEW FREQUENCIES WERE GENERATED FOR AN EQUIP. = 0 FOR NO; = 1 FOR YES; -1 FOR ERRORS ENCOUNTERED DURING GENERATION
NE1	INDEX FOR STORING EQUIPMENT ID OF DELETED EQUIPMENT
NFQMXS	SAVES NFQMX FROM ISF HEADER WHEN SWITCH IS MADE TO ADD PIF EQPT.
NFQOS	SAVES NFQO SAME AS FOR NFQMXS ABOVE
NFQUS	SAVES NFQU SAME AS FOR NFQMXS ABOVE
NFRQS	SAVES NFRQ SAME AS FOR NFQMXS ABOVE
NP	INDEX, USUALLY USED FOR NUMBER OF PORTS PER EQPT.
NPSAVE	SAVES NUMBER OF OLD ISF AS INDICATOR OF NUMBER OF SPEC. HEADER RECORDS ON OLD ISF
NR	EQUIV = ISO (IP, 4), NO. HARMONICS IF RF
NSP	EQUIV = ISO (IP, 3), NO. SO PARAMETERS OR EQUIV = IRO (IP, 3), NO. RCPT PARAMETERS
NSP1	EQUIV = ISO (IP, 2); IF CASE, NUMBER OF NARROWBAND POINTS
NWIR1	NUMBER OF WIRES IN CURRENT BUNDLE
NWS	NUMBER OF WIRE SEGMENTS
NWS2P	NUMBER OF WIRE SEGMENTS TIMES TWO FROM PIF FILE
NWS41P	NUMBER OF WIRE SEGEMENTS TIMES 4 LESS 1 FROM PIF FILE, GIVING NUMBER OF ENTRIES IN IBEP ARRAY

5.1.13 Name: BUNDLE

DESCRIPTION

Subroutine BUNDLE processes wire bundle data into the form required for analysis of wire coupled ports. A topological tree is created for each wire which passes through the node points specified, and all end points on the tree are referenced to a unique port connection.

Each wire branch is a topological segment which, if cut, would result in two unconnected trees, one connected to a subset of all ports connected to the original wire and the other connected to the remaining ports. The subroutine branches out from each wire segment and compiles the list of port connections in the subsets. The wire segment is then related to one of the ten allowable bundle segments and its physical parameters. The processed wire data is stored for later use in the wire map file.

DATA REQUIREMENTS

ARGUMENTS:

IBNDLE - bundle index

COMMON BLOCKS:

IOUNIT, IOUSCF, IOUWK, SYS2, ISF

TABLE 13

BUNDLE VARIABLES

PROGRAM NAME	DEFINITION
I	COUNTING INDEX
IBS	BUNDLE SEGMENT INDEX
IBSP	BUNDLE MAP ARRAY
IB10	BUNDLE SEGMENT INDEX
IB2	BUNDLE SEGMENT INDEX
IB3	BUNDLE SEGMENT INDEX
IB4	BUNDLE SEGMENT INDEX
IB5	BUNDLE SEGMENT INDEX

TABLE 13 (Continued)

PROGRAM NAME	DEFINITION
IB6	BUNDLE SEGMENT INDEX
IB7	BUNDLE SEGMENT INDEX
IB8	BUNDLE SEGMENT INDEX
IB9	BUNDLE SEGMENT INDEX
IEND	INDICES OF ALL PORTS CONNECTED TO A WIRE
IFIRST	FLAG INDICATING WHETHER THE FIRST BRANCH POINT HAS BEEN FOUND
IN1	PORT INDEX
IN2	PORT INDEX
IPOINT	BUNDLE POINT INDEX
IPT	BUNDLE POINT INDEX
IPTW1	BUNDLE POINT INDEX
IPTW2	BUNDLE POINT INDEX
IPT1	BUNDLE POINT INDEX
IPT10	BUNDLE POINT INDEX
IPT2	BUNDLE POINT INDEX
IPT3	BUNDLE POINT INDEX
IPT4	BUNDLE POINT INDEX
IPT5	BUNDLE POINT INDEX
IPT6	BUNDLE POINT INDEX
IPT7	BUNDLE POINT INDEX
IPT8	BUNDLE POINT INDEX
IPT9	BUNDLE POINT INDEX
IRBSP	WIRE MAP ARRAY

TABLE 13 (Continued

PROGRAM NAME	DEFINITION
ISEG	COUNTING INDEX (SEGMENT)
ISH	SHIELD GROUND CODE
ISHGD	NUMBER OF GROUNDS
IW	COUNTING INDEX (WIRE)
IWIRE	COUNTING INDEX (WIRE)
IY	COUNTING INDEX
I1	DO LOOP INDEX IN WIRE POINT SEARCH
I10	DO LOOP INDEX IN WIRE POINT SEARCH
I2	DO LOOP INDEX IN WIRE POINT SEARCH
I3	DO LOOP INDEX IN WIRE POINT SEARCH
I4	DO LOOP INDEX IN WIRE POINT SEARCH
I5	DO LOOP INDEX IN WIRE POINT SEARCH
I6	DO LOOP INDEX IN WIRE POINT SEARCH
I7	DO LOOP INDEX IN WIRE POINT SEARCH
I8	DO LOOP INDEX IN WIRE POINT SEARCH
I9	DO LOOP INDEX IN WIRE POINT SEARCH
J	COUNTING INDEX
J1	BUNDLE POINT INDEX
J2	BUNDLE POINT INDEX
K	COUNTING INDEX
L	COUNTING INDEX
NBR	NUMBER OF BRANCHES INTO A WIRE POINT
NENDPT	NUMBER OF WIRE POINTS THAT ARE TERMINATIONS

TABLE 13 (Concluded)

PROGRAM NAME	DEFINITION
NGNDSH	GREATEST NUMBER OF GROUNDS AMONG TERMINATIONS ON ONE SIDE OF A BRANCH
NW	TEMPORARY VARIABLE
NWPT	NUMBER OF POINTS THROUGH WHICH A WIRE PASSES

5.1.14 Name: CONVRT

DESCRIPTION

This routine converts modulation/signal codes for RF and SIGNAL/ CONTROL ports from a numeric code back to an alphanumeric code for printing in REPORT.

DATA REQUIREMENT

ARGUMENTS:

INTRY - flag signaling which entry; = 1 for RF, = 2 for S/C

MODSIG - modulation/signal numeric code

IP2 - PTYPE numeric code for RF radar ports, UNITS numeric code for S/C

IPNT1 - alphanumeric code returned for MODSIG

IPNT2 - alphanumeric code returned for IP2

COMMON BLOCKS:

ERR, ALPS

TABLE 14

CONVRT VARIABLES

PROGRAM NAME	DEFINITION
I	DO LOOP INDEX
IBK	AN ARRAY OF HOLLERITH BLANKS
IUN	HOLLERITH PRINT CODES FOR UNITS, VL AND AM
JJ	INDEX WHERE MODSIG VALUE FOUND IN ALPHA ARRAY
KK	INDEX WHERE IP2 VALUE FOUND IN ALPHA ARRAY
L	INDEX TO SEARCH ARRAY OF ALPHA CODES VALUES FOR VALUE TO MATCH ARGUMENT MODSIG OR IP.

5.1.15 **Name: DEDEND**

DESCRIPTION

Stores the port index of a wire termination in the array IEND1, and the number of grounded shields in the array IS1.

DATA REQUIREMENTS

ARGUMENTS:

IBNDLE - bundle index

IWIRE - wire index

IB - segment index

IY - counting index

IPOINT - point index

COMMON BLOCKS:

ISF, BUN, IOUNIT

TABLE 15

DEDEND VARIABLES

PROGRAM NAME	DEFINITION
I	INDEX
IERR	ERROR CODE
ISH	SHIELD GROUND CODE
ISHGD	SHIELD GROUND CODE INDEX

5.1.16 Name: DUPCK

DESCRIPTION

This subroutine checks an array of items for duplicate identifications.

DATA REQUIREMENTS

ARGUMENTS:

N - number of array

IARY - array of identifications

COMMON BLOCKS:

IOUNIT, ERR, DUPE, FFDTA

TABLE 16

DUPCK VARIABLES

PROGRAM NAME	DEFINITION
I	INDEX
ID1	ID OF AN ARRAY COMPONENT
ID2	ID OF AN ARRAY COMPONENT
I1	INDEX
K	INDEX
L	INDEX
N1	NUMBER ENTRIES IN ARRAY MINUS 1

5.1.17 Name: EFLUPD

DESCRIPTION

This routine updates environmental field level data.

DATA REQUIREMENTS

ARGUMENTS:

IC - control flag to tell which call is being made; =1-outer data; =2-inner data

MOD - modify code

IE - flag telling which data was present previously; =1-outer; =2-inner; =3-both

NE - number in arrays

E2 - old array

E1 - update array

COMMON BLOCKS:

ERR

TABLE 17

EFLUPD VARIABLES

PROGRAM NAME	DESCRIPTION
I	INDEX
MESS	HOLLERITH ARRAY FOR PRINTING HEADINGS

5.1.18 Name: FTGEN

DESCRIPTION

This routine generates the frequency table used for the analysis task.

DATA REQUIREMENTS

ARGUMENTS:

none

COMMON BLOCKS:

ISF, IOUNIT, ERR, MBUG

TABLE 18

FTGEN VARIABLES

PROGRAM NAME	DEFINITION
FHI2A	0.9999 TIMES FHI2
FMAX	ARRAY CONTAINING MAXIMUM FREQUENCIES FOR EACH SR CODE
FMAX1	MAXIMUM FREQUENCY FOR SELECTED SR CODE
FMIN	ARRAY CONTAINING MINIMUM FREQUENCIES FOR EACH SR CODE
FMIN1	MINIMUM FREQUENCY FOR SELECTED SR CODE
FMULT	FREQUENCY MULTIPLIER FOR GEOMETRICALLY SPACED FREQUENCIES
FQU	USER SUPPLIED FREQUENCY
FREQ	CURRENT VALUE OF GEOMETRICALLY SPACED FREQUENCY BEING GENERATED
FREQP	PREVIOUSLY GENERATED FREQUENCY
I	GENERAL INDEX
IEMR	INDEX (= 1 FOR EMTR, = 2 FOR RECEPTOR)
IFMIN	INDEX OF TABLE FREQUENCY CLOSEST TO FMIN1
IFMX	INDEX OF TABLE FREQUENCY CLOSEST TO FMAX1

TABLE 18 (Concluded)

PROGRAM NAME	DESCRIPTION
IFQ	GENERAL FREQUENCY INDEX
IFQU	INDEX OF USER - SUPPLIED FREQUENCY
ISR	SR (SOURCE - RECEPTOR TYPE) CODE
J	GENERAL INDEX
NFRQ1	HOLDING VARIABLE FOR NFRQ

5.1.19 Name: FTSRCH

DESCRIPTION

This routine searches the frequency table for the interval that contains a given frequency.

DATA REQUIREMENTS

ARGUMENTS:

FRQT - frequency table to be searched

FRQLOC - frequency to be located

IT1 - lowest index of frequency table to be searched

IT2 - highest index of frequency table to be searched

ILOC - index of interval in frequency table containing FRQLOC returned to calling routine

COMMON BLOCKS:

none

TABLE 19

FTSRCH VARIABLES

PROGRAM NAME	DEFINITION
FT	TABLE FREQUENCY
FTH	HIGHER INTERVAL BOUNDARY FREQUENCY
FTL	LOWER INTERVAL BOUNDARY FREQUENCY
I	INDEX OF FT
XINT	SEARCH INTERVAL RANGE

5.1.20 Name: HEADA

DESCRIPTION

This routine writes heading and system data for the report.

DATA REQUIREMENTS

ARGUMENTS:

none

COMMON BLOCKS:

SYS2, INDX, IOUNIT, TITLE, ISF, ERR, XYZ, FFDTA, ALPS, PID, STIX, NLINE

TABLE 20

HEADA VARIABLES

PROGRAM NAME	DEFINITION
I	DO LOOP INDEX
IST	SYSTEM TYPE CODE
ISYSH	HOLLERITH SYSTEM TYPE HEADER PRINT DATA
J	DO LOOP INDEX
K	DO LOOP INDEX
L	DO LOOP INDEX
L1	DO LOOP INDEX
NA	NUMBER OF APERTURES
NAM	FLAG THAT TELLS WHETHER AN OLD ISF, NEW ISF OR PIF REPORT IS BEING PRINTED. 1 = OLD ISF OR PIF; 2 = NEW ISF

5.1.21 Name: ISFRIT

DESCRIPTION

This routine writes the new Intrasystem Signature File.

DATA REQUIREMENTS

ARGUMENTS:

IGO - control flag

IGO=1, write system data

IGO=2, write equipment data

IGO=3, write bundle data

IGO=4, write end-of-equipment data flag

IGO=5, write end-of-bundle data flag

IGO=6, write spectrum data

COMMON BLOCKS:

SYS2, INDX, XYZ, TITLE, PID, IOUNIT, ERR, MBUG

TABLE 21

ISFRIT VARIABLES

PROGRAM NAME	DEFINITION
I	DO LOOP INDEX
IDUM	DUMMY PLACEHOLDERS
IEND	ENDING INDEX FOR SUBPARAMETERS
IEND2	END INDEX FOR SUBPARAMETERS
IS	STARTING INDEX OF SUBPARAMETERS IN SRCE2 ARRAY
ISR	SOURCE/RECEPTOR CODE, EQUAL TO [illegible]02/IRO2(IPRT, 6)
IW	DO LOOP INDEX
I999	END-OF-DATA "999" FLAG

TABLE 21 (Concluded)

PROGRAM NAME	DEFINITION
J	DO LOOP INDEX
K	DO LOOP INDEX
MODSIG	MODULATION/SIGNAL CODE
NP	NUMBER OF PORTS/EQUIPMENT
NP2	NUMBER OF PORTS/EQUIPMENT
NR	NUMBER OF HARMONICS
NSP	EQUIVALENT TO ISO2(IPRT, 3) OR IRO2(IPRT, 3) SEE TABLE 48
NSP1	NUMBER POINTS IN NARROW BAND FOR CASE TYPES
NWS	NUMBER OF BUNDLE SEGMENTS
NWS2	NUMBER OF BUNDLE SEGMENTS TIMES 2
NWS41	ENDING INDEX IN BUNDLE SEGMENTS INTEGER ARRAY

5.1.22 Name: MAP

DESCRIPTION

Subroutine MAP reads from the wire bundle working file and does preliminary processing before calling BUNDLE, which actually analyzes the wire configurations. It redefines bundle and wire points within each bundle by an index and relates each wire point to its port connection by searching port data. It also calculates the average separation between two wires in a bundle and the length of each segment.

DATA REQUIREMENTS

ARGUMENTS:

None

COMMON BLOCKS:

IOUNIT, IOUWK, IOUSCF, ISYS2 and ISF.

TABLE 22

MAP VARIABLES

PROGRAM NAME	DEFINITION
AVRAD	AVERAGE WIRE RADIUS
DRATIO	RATIO OF BUNDLE RADIUS TO WIRE RADIUS VS NUMBER OF WIRES
I	COUNTING INDEX
IBUNDLE	BUNDLE INDEX
ICODE	CODED BUNDLE-WIRE INDICES
IPNT	WIRE POINT INDEX
IPORT	COUNTING INDEX (PORT)
IPT	COUNTING INDEX (POINT)
IRETYP	WIRE TYPE CODE
ISEG	COUNTING INDEX (SEGMENT)
IW	COUNTING INDEX (WIRE)

TABLE 22 (CONCLUDED)

PROGRAM NAME	DEFINITION
IWIRE	COUNTING INDEX (WIRE)
I1	TEMPORARY INDEX
I2	TEMPORARY INDEX
J	COUNTING INDEX
JCODE	CODED BUNDLE-WIRE INDICES
K	COUNTING INDEX
N	TEMPORARY INDEX
NBUNDLE	NUMBER OF WIRE BUNDLES
NWPT	NUMBER OF WIRE POINTS FOR PARTICULAR WIRE
RAD	WIRE RADIUS
X	PROJECTION OF SEGMENT LENGTH IN X-DIRECTION
Y	PROJECTION OF SEGMENT LENGTH IN Y-DIRECTION
Z	PROJECTION OF SEGMENT LENGTH IN Z-DIRECTION

5.1.23 Name: MERGER

DESCRIPTION

This routine merges data arrays at the request of MERGE. It adds or deletes new components and compresses the data after a delete.

DATA REQUIREMENTS

ARGUMENTS:

NOS - number of components in OLD ISF

NOI - number of components in updating ISF

IARYI - integer array, updating file

M1 - first dimension of integer array

M2 - second dimension of integer array

FARYS - floating point array, old ISF

FARYI - floating point array, updating file

M3 - first dimension of floating point array

M4 - second dimension of floating point array

MODARY - array continuing modify codes for the data in the updating file

0 = add; 1 = modify

JI - actual number of parameters in integer array

JF - actual number of parameters in floating point array

IE - control flag for processing;

= 1, modifications to be made to ISF file

= 2, transfer PIF arrays to ISF arrays only

= 3, port entry

= 4, wire entry

ARGUMENTS: (Continued)

IDELAY - array of ID's of components to be deleted

MDEL - number of deletes in IDELAY

COMMON BLOCKS:

ISF, FFDTA, ERR, XYZ, DUPE, TITLE, PID, INDX, IOUNIT, MOD, MBUG

TABLE 23

MERGER VARIABLES

PROGRAM NAME	DEFINITION
I	DO LOOP INDEX
IADD	COUNTER OF THE NUMBER OF ADDED COMPONENTS
ID	IDENTIFICATION OF A DELETED COMPONENT
IDI	IDENTIFICATION OF AN UPDATING "ADDED" COMPONENT
IDP	IDENTIFICATION OF A PORT FROM THE OLD ISF
IDS	IDENTIFICATION OF AN OLD ISF COMPONENT
IJ	INDEX USED TO COUNT DELETES FOUND DURING COMPRESSION OF ARRAYS
ITYP	SO/RC CODE FOR PORT DATA, = 1, IF PORT IS SOURCE ONLY; = 2, IF PORT IS RECEPTOR ONLY; = 3, IF PORT IS BOTH
IX	DO LOOP INDEX
J	DO LOOP INDEX
JII	EQUAL JI FOR ALL EXCEPT PORT ENTRIES IN WHICH CASE IT IS EQUAL TO "9" TO OMIT TRANSFERRING THE SO/RC CODE
K	INDEX FOR STORING INTO UPDATED ARRAY
KJ	COMPUTED INDEX OF ARRAYS TO BE STORED INTO DURING COMPRESSION OF ARRAYS
L	DO LOOP INDEX
M	INDEX OF THE ID WITHIN THE ARRAY. IT IS EQUAL TO 1 EXCEPT FOR WIRE DATA IN WHICH CASE IT EQUALS 2

TABLE 23 (Concluded)

PROGRAM NAME	DEFINITION
MD	SET EQUAL TO THE MOD CODE OF THE COMPONENT BEING PROCESSED
MDEL	NUMBER OF DELETES IN DELETE ARRAY, IDELAY
MODARY	ARRAY OF MODIFICATION CODES FOR THE UPDATING COMPONENT
MS	SET EQUAL TO THE SC/RC CODE OF THE PORT BEING PROCESSED
NDEL	NUMBER OF DELETES FOUND DURING DELETING PROCESS
NNOS	SET EQUAL TO ORIGINAL NUMBER OF COMPONENTS IN THE OLD ISF
NO	ONE MORE THAN THE NUMBER IN OLD ISF ARRAYS
NP	NUMBER OF PORTS IN AN EQPT. USED FOR A PORT ENTRY ONLY

5.1.24 Name: READEQ

DESCRIPTION

This routine reads the data from the Intrasystem Signature File. On a new job, it reads the Processed Input File.

DATA REQUIREMENTS

ARGUMENTS:

IMAP - control variable set as follows:

= -2, read equipment header record only

= -1, read equipment data after the header

= 1, read all of equipment

= 2, read bundle data

= 3, read bundle data after the header record

= 4, read system data

COMMON BLOCKS:

INDX, ISF, STIX, SPECT, TITLE, SYS2, IOUNIT, NWS, MBUG

TABLE 24

READEQ VARIABLES

PROGRAM NAME	DEFINITION
I	DO LOOP INDEX
IDUM	PLACE HOLDER ON EQUIPMENT HEADER TO KEEP THE HEADING RECORD THE SAME AS THE PIF FILE HEADING RECORD
IEND	INDEX EQUAL TO THE NUMBER OF ELEMENTS IN A VARIABLE ARRAY, SUCH AS A FLOATING POINT SO/RC ARRAY
IEND2	INDEX EQUAL TO THE NUMBER OF ELEMENTS IN VARIABLE ARRAYS, SUCH AS IN FLOATING POINT SO/RC ARRAY
IP	PORT INDEX
IQ2	COUNTER OF NUMBER OF EQUIPMENTS READ

TABLE 24 (Concluded)

PROGRAM NAME	DEFINITION
IR	NUMBER OF CHARACTERS IN THE REMARKS ARRAY
IS	STARTING INDEX OF DATA IN VARIABLE ARRAYS, SUCH AS SO/RC ARRAYS
ISR	SOURCE/RECEPTOR TYPE CODE
IT	NUMBER OF CHARACTERS IN THE TITLE ARRAY
ITYP	PORT TYPE CODE
IW	WIRE INDEX
J	USED AS AN INDEX
K	USED AS AN INDEX
MODSIG	MODULATION/SIGNAL CODE
NP	NUMBER OF PORTS/EQUIPMENT
NR	NUMBER OF HARMONICS FOR RF PORTS
NSP	NUMBER OF SUBPARAMETERS
NSP1	NUMBER OF SUBPARAMETERS IN NARROWBAND SPECTRA FOR CASE TYPE PORTS
NS2	NUMBER OF BUNDLE SEGMENTS
NWIR2	NUMBER OF WIRES IN A BUNDLE
NWS2	NUMBER OF BUNDLE SEGMENTS TIMES 2
NWS41	NUMBER OF DATA ELEMENTS IN IBEP2 ARRAY, EQUAL TO 1 MORE THAN 4 TIMES THE NUMBER OF SEGMENTS PER BUNDLE

5.1.25 Name: REPORT

DESCRIPTION

This routine writes a report of all data. Depending upon the call, it writes a report of the data on the PIF file or the ISF file before and after a modification.

DATA REQUIREMENTS

ARGUMENTS:

IRGO - control variable that tells which type of data report is being requested

= 1, write system data report

= 2, write equipment data report

= 3, write bundle data report

= 4, write spectra report

COMMON BLOCKS:

XYZ, STIX, ISF, NLINE, PID, TITLE, SPECT, ALPS, IOUNIT, FFDTA, INDX,

EER, SYS2, MBUG

TABLE 25

REPORT VARIABLES

PROGRAM NAME	DEFINITION
FIF	INTERMEDIATE FREQUENCY
FREQ	A FREQUENCY
I	DO LOOP INDEX
IAPEX	HOLLERITH ARRAY FOR PRINTING APERTURE EXPOSED CODES
IAPX	APERTURE EXPOSED CODE PLUS ONE
ICON	CONNECTION TYPE CODE
IDEQPT	EQUIPMENT ID (ALPHA)
IDPT	PORT ID (ALPHA)
IDSUB	SUBSYSTEM ID (ALPHA)
IDUM	HOLLERITH BLANK
IEND	NUMBER OF ELEMENTS IN A VARIABLE NUMBER ARRAY, SUCH AS A FLOATING POINT SO/RC ARRAY
IEND2	NUMBER OF ELEMENTS IN A VARIABLE NUMBER ARRAY
IEOI3	FLAG FOR ENVIRONMENTAL FIELD DATA. = 1 IF NONE PRESENT; = 2 IF OUTER; = 3 IF INNER; = 4 IF BOTH PRESENT
IF	INDEX USED FOR FILTERS AND FREQUENCIES
IFNAM	FLAG = 1 IF OLD ISF FILE; = 2 IF NEW ISF; = 3 IF PIF FILE
IF1	FREQUENCY INDEX FOR MINIMUM FREQUENCY FOR SO/RC TYPES
IF2	FREQUENCY INDEX FOR MAXIMUM FREQUENCY FOR SO/RC TYPES
IN	INDEX FOR PRINTING DIFFERENT MODSIG TYPE HOLLERITH HEADINGS
INDEX	FILTER TYPE CODE

TABLE 25 (Continued)

PROGRAM NAME	DEFINITION
IP	PORT INDEX
IPN1	ARRAY FOR PRINTING HOLLERITH DATA; USED TO PRINT SHIELD TERMINATION FOR WIRE PORT. ALSO USED ON SO/RC HOLLERITH PRINTOUT. SEE CONVRT ARGUMENT LIST
IPN2	ARRAY USED FOR PRINTING HOLLERITH DATA. SEE CONVRT ARGUMENT LIST
IPOL	POLARIZATION CODE FOR ANTENNA
IPTSG	PTYPE FOR RADAR TYPES; SIGNAL CODE FOR MODSIG CODES 301-305
IP2	UNITS CODE OF AMPLITUDE FOR S/C TYPE PORTS
IQ	INDEX OF EQUIPMENT BEING REPORTED
IRECEP	HOLLERITH FOR PRINTING "RCPT"
IRS	RS CODE FOR POWER PORTS
IS	INDEX OF STARTING LOCATION OF PARAMETERS IN FLOATING POINT ARRAYS
ISH	INDEX FOR PRINTING SHIELD TERM. CODE
ISOURC	HOLLERITH FOR PRINTING "SRCE"
ISR	SIGNAL/RECEPTOR TYPE CODE
ISRLBL	INDEX FOR PRINTING SOURCE/RECEPTOR LABELS
ISUBID	NUMERIC CODE FOR SUBSYSTEM ID
ITYP	PORT TYPE CODE
IW	WIRE INDEX
IWC	INDEX TO PRINT WING LOCATION OF ANTENNA PORT
IZ	FLAG SET TO 1 AFTER A HEADING IS PRINTED SO AS TO SKIP PRINTOUT ON NEXT PASSES
IZ1	INDEX FOR PRINTING MILSPEC FOR NARROWBAND
IZ2	INDEX FOR PRINTING MILSPEC FOR BROADBAND SPECTRA

TABLE 25 (Continued)

PROGRAM NAME	DEFINITION
I2	INDEX FOR PRINTING SECOND HALF OF ENVIRONMENTAL FIELD LEVEL DATA. USED SIMILARLY FOR FREQUENCY TABLE
I3	INDEX FOR PRINTING THIRD GROUP OF FREQUENCIES
J	INDEX USED IN PRINTING BUNDLE DATA
JJ	DO LOOP INDEX
K	INDEX
KK	INDEX
LL	INDEX
L4	INDEX FOR PRINTING FIX/ADJ CODE OF EQUIPMENT CARD
L6	INDEX FOR PRINTING CLASS CODE OF EQPT CARD
M	INITIAL INDEX FOR PRINTING BEP2 ARRAY
MAXLIN	EQUIVALENT TO THE NUMBER OF MAXIMUM LINES PRINTED PER PAGE
MCOD	ANTENNA MODEL CODE
MILS	HOLLERITH TO PRINT "MIL SPEC"
MN	TERMINAL INDEX FOR BEP2 ARRAY
MODSIG	MODULATION/SIGNAL CODE FOR A PORT
MT	EQUIVALENT TO A MESSAGE TITLE ARRAY FOR RF PORTS
MTT	EQUIVALENT TO A MESSAGE TITLE ARRAY FOR SIGNAL/CONTROL LINE PORTS SUBPARAMETERS
M3	EQUIVALENT TO MODSIG DIVIDED BY 100
NA	NUMBER OF ANTENNAS
NBBB	HOLLERITH TO PRINT NARROWBAND L. [illegible]EL
NEFQ1	HALF THE NUMBER OF FREQUENCIES FOR ENVIRONMENTAL FREQUENCY LEVEL DATA
NF	NUMBER OF FILTERS

TABLE 25 (Concluded)

PROGRAM NAME	DEFINITION
NFQ1	THE NUMBER OF FREQUENCIES TO BE USED FOR THE RUN
NF1	ONE THIRD THE NUMBER OF FREQUENCIES TO BE USED FOR SPECTRA
NP	NUMBER OF PORTS INDEX
NPM	NUMBER OF SUBPARAMETERS. USED FOR ANTENNA AND FILTER PRINTOUTS
NP1	NUMBER OF SUBPARAMETERS IN FIRST SUBPARAMETER GROUP. USED FOR SO/RC CASE PRINTOUTS
NP2	NUMBER OF SUBPARAMETERS IN SECOND SUBPARAMETER GROUP. USED FOR SO/RC CASE PRINTOUTS
NSP	NUMBER OF SUBPARAMETERS
NSP1	NUMBER OF SUBPARAMETERS IN A FIRST SUBPARAMETER GROUP
NSP2	NUMBER OF SUBPARAMETERS IN A SECOND SUBPARAMETER GROUP
NTW	NUMBER OF TWISTED WIRES IN A WIRE CHARACTERISTICS TABLE ENTRY
NW	INDEX FOR NUMBER WIRE TABLE ENTRIES
SCRON	HOLLERITH FOR PRINTING SO/RC CONNECTION CODE
SRLBL	HOLLERITH OF SOURCE/RECEPTOR TYPE LABELS
SRMG	HOLLERITH ARRAY OF SR LABELS

5.1.26 Name: WARITE

DESCRIPTION

This routine writes a report of Waiver Analysis data for a Waiver Analysis run.

DATA REQUIREMENTS

ARGUMENTS:

None

COMMON BLOCKS:

CEARV, FFDTA, ERR, IOUNIT

TABLE 26

WARITE VARIABLES

PROGRAM NAME	DEFINITION
I	INDEX
J	INDEX
K	INDEX

5.1.27 Name: WFRIT

DESCRIPTION

This routine writes work files that are used by CEAR/SGR. The files written depending on the calling argument are the emitter equipment, receptor equipment, and bundle work files.

DATA REQUIREMENTS

ARGUMENTS:

IMAP - flag which signals which work files are to be written.

- = 1, emitter and receptor equipment
- = 2, bundle work file
- = 3, write end-of-data flag for emitter and receptor file
- = 4, write end-of-data flag on bundle work file

COMMON BLOCKS:

IL..K, IOUWK, STIX, ISF, TITLE, SPECT, IOUNIT, MBUG

TABLE 27

WFRIT VARIABLES

PROGRAM NAME	DEFINITION
I	INDEX
IEND	TERMINAL INDEX USED FOR VARIABLE NUMBER PARAMETER ARRAYS, SUCH AS SOURCE AND RECEPTOR
IEND2	TERMINAL INDEX USED FOR VARIABLE NUMBER PARAMETER ARRAYS
IP	PORT INDEX
IRCFLG	FLAG THAT TELLS [illegible] RECEPTOR WORK FILE IS TO BE WRITTEN
IS	INITIAL INDEX USED FOR VARIABLE NUMBER PARAMETER ARRAY
ISOFLG	FLAG THAT TELLS IF A SOURCE WORK FILE IS TO BE WRITTEN

TABLE 27 (Concluded)

PROGRAM NAME	DEFINITION
ISR	SOURCE/RECEPTOR CODE
ITIM	DO LOOP INDEX
ITO	LOGICAL UNIT FOR WRITING TO A WORK FILE
ITYP	PORT TYPE
IW	WIRE INDEX
J	INDEX
K	INDEX
MODSIG	MODULATION/SIGNAL CODE
NP	NUMBER OF PORTS
NR	NUMBER OF HARMONICS
NSP	NUMBER OF SUBPARAMETERS
NSP1	NUMBER OF SUBPARAMETERS IN A FIRST SUBPARAMETER GROUP
NWIR2	NU[illegible] OF WIRES PER BUNDLE
NWS2	NUMBER OF WIRE SEGMENTS TIMES 2 EQUAL TO NUMBER OF ENTRIES IN BEP2 ARRAY
NWS41	NUMBER OF WIRE SEGMENTS TIMES 4 PLUS 1 EQUAL TO NUMBER ENTRIES IN IBEP2 ARRAY

5.1.28 Name: SPCMDL

DESCRIPTION

Subroutine SPCMDL calls the various spectrum models to initialize emitter and receptor spectra and spectrum limits for six classes of ports: RF, power, signal, control, electro-explosive, and equipment case. At frequencies outside the required operating range of a device, it calls non-required initial spectrum models M461, M6181 or M704, the choice being a user option.

At required frequencies it calls SCARFE for emission models and SCARFR for reception models, unless a user-provided spectrum is called for. In the latter case, the emission or reception spectrum is log-linearly interpolated at emitter or receptor frequencies, respectively.

For RF emitters, user-provided spurious emission levels at harmonic frequencies are compared with the MIL-STD level and the larger of the two is taken.

DATA REQUIREMENTS

ARGUMENTS:

ISPFG-Spectrum flag

1 = emitter port

2 = receptor port

3 = both

COMMON BLOCKS:

INDX, SPIRO, ISF, IOUNIT, SPECT, ERR

TABLE 28

SPCMDL VARIABLES

PROGRAM NAME	DEFINITION
CL	CAPACITANCE OF A PORT TERMINATION
FREQ	FREQUENCY
G	TEMPORARY VARIABLE
GBH	BROAD BAND HARMONIC LEVEL
GNH	NARROW BAND HARMONIC LEVEL
I	COUNTING INDEX

TABLE 28 (Continued)

PROGRAM NAME	DEFINITION
ICON	PORT CONNECTION CODE
IEMSU	EMITTER/RECEPTOR FLAG (1=EMITTER, 2=RECEPTOR)
IFRRQ	COUNTING INDEX
IFSPT	INDEX OF LAST LEVEL IN USER-SUPPLIED SPECTRUM
IFST	INDEX OF FIRST FREQUENCY IN USER-SUPPLIED SPECTRUM
IFSTB	INDEX OF FIRST FREQUENCY FOR BROAD BAND SPECTRUM
IFSTN	INDEX OF FIRST FREQUENCY FOR NARROW BAND SPECTRUM
IF1	LOW FREQUENCY POINTER
IF2	HIGH FREQUENCY POINTER
IHAR	HARMONIC NUMBER
INBFG	NARROW BAND/BROAD BAND CODE (0=BOTH, 1=BROAD BAND ONLY, 2=NARROW BAND ONLY)
INPASS	FIRST PASS FLAG (1=FIRST PASS)
ISHAR	INDEX OF FIRST HARMONIC LEVEL
ISR	SR CODE (1=RF, 2=POWER, 3=SIGNAL, 4=CONTROL, 5=FEED, 6=CASE)
ISRE	SR CODE FOR EMITTER
ISRR	SR CODE FOR RECEPTOR
ISTOP	INDEX OF LAST FREQUENCY IN USER SUPPLIED SPECTRUM
LL	INDUCTANCE OF A PORT TERMINATION
RFR1	LOW END OF REQUIRED FREQUENCY RANGE
RFR2	HIGH END OF REQUIRED FREQUENCY RANGE
RH1	LOW END OF HARMONIC FREQUENCY INTERVAL
RH2	HIGH END OF HARMONIC FREQUENCY INTERVAL
RH	RESISTANCE OF A PORT TERMINATION
SPBMX	MAXIMUM BROAD BAND EMISSION LEVEL IN REQUIRED RANGE

TABLE 28 (Continued)

PROGRAM NAME	DEFINITION	
SPNMX	MINIMUM BROAD BAND EMISSION LEVEL IN REQUIRED RANGE	
W	FREQUENCY IN RADIANS/SEC	
X	PROPORTION OF CURRENT THROUGH ACTIVE ELEMENT OF EED	
Z	TEMPORARY ARRAY	
EQUIVALENCED VARIABLES:		
A	S(4)	IN COMMON BLOCK SPIRO
BWC	S(5)	IN COMMON BLOCK SPIRO
ADJLIM	S(1)	IN COMMON BLOCK SPIRO
FH	S(3)	IN COMMON BLOCK SPIRO
FL	S(2)	IN COMMON BLOCK SPIRO
FP	S(3)	IN COMMON BLOCK SPIRO
IFMAXE(I)	IFMAX(I,1)	IN COMMON BLOCK ISF
IFMAYR(I)	IFMAX(I,2)	IN COMMON BLOCK ISF
IFMINE(I)	IFMIN(I,1)	IN COMMON BLOCK ISF
IFMINR(I)	IFMIN(I,2)	IN COMMON BLOCK ISF
INF	S(3)	IN COMMON BLOCK SPIRO
IRS	IS(2)	IN COMMON BLOCK SPIRO
ISPEC	IEPRM2(3)	IN COMMON BLOCK ISF
MOSIG	IS(2)	IN COMMON BLOCK SPIRO
NHARF	IS(4)	IN COMMON BLOCK SPIRO
NPAR	IS(3)	IN COMMON BLOCK SPIRO
NPHASE	IS(4)	IN COMMON BLOCK SPIRO
NPTBB	IS(3)	IN COMMON BLOCK SPIRO
NPTNB	IS(2)	IN COMMON BLOCK SPIRO
NPTS	IS(3)	IN COMMON BLOCK SPIRO

TABLE 28 (Concluded)

PROGRAM NAME	DEFINITION	
NUNIT	IS(4)	IN COMMON BLOCK SPIRO
P	S(4)	IN COMMON BLOCK SPIRO
PNF	S(2)	IN COMMON BLOCK SPIRO
SEN	S(4)	IN COMMON BLOCK SPIRO
V	S(2)	IN COMMON BLOCK SPIRO

5.1.29 Name: ANLOG

DESCRIPTION

Subroutine ANLOG calculates the power spectral density of continuously modulated RF signals. The models include AM/DSB, AM/DSB-SC, and FM modulation carrying either voice, clipped voice or non-voice.

DATA REQUIREMENTS

ARGUMENTS:

NTYPE - Modulation Type

DFREQ - Frequency relative to carrier.

COMMON BLOCKS:

SPIRO

TABLE 29

ANLOG VARIABLES

PROGRAM NAME	SYMBOL	DEFINITION
BFM		FM BANDWIDTH
DF	f	FREQUENCY RELATIVE TO RF CARRIER
NSIG		MODULATING SIGNAL TYPE CODE
PSB	P_{SB}	POWER ASSOCIATED WITH AN AM SIDEBAND
Y		TEMPORARY VARIABLE
EQUIVALENCED VARIABLES:		
B	S(6)	IN COMMON BLOCK SPIRO
EM	S(7)	IN COMMON BLOCK SPIRO
FDEV	S(7)	IN COMMON BLOCK SPIRO
ISIG	IS(5)	IN COMMON BLOCK SPIRO
P	S(4)	IN COMMON BLOCK SPIRO

5.1.30 Name: CVOICE

DESCRIPTION

Calculates the spectrum of a clipped voice signal.

DATA REQUIREMENTS

ARGUMENTS:

X - frequency relative to carrier or DC

I - RF flag (0 = no, 1 = yes)

Y - output level

COMMON BLOCKS:

None

LOCAL VARIABLES:

None

5.1.31 Name: CW

DESCRIPTION

Calculates the spectrum of a pure sinusoidal signal

DATA REQUIREMENTS

ARGUMENTS:

NTYPE - modulation code (2 = CW)

DFREQ - frequency relative to carrier

COMMON BLOCKS:

SPIRO

TABLE 30

CW VARIABLES

PROGRAM NAME	DEFINITION
P	AVERAGE POWER IN CW SIGNAL IN WATTS (EQUIVALENCED TO S(4) IN COMMON BLOCK SPIRO)

5.1.32 Name: EEDMDL

DESCRIPTION

Calculates the susceptibility of an electro-explosive device.

DATA REQUIREMENTS

ARGUMENTS:

None

COMMON BLOCKS:

SPIRO, EEE

TABLE 31

EEDMDL VARIABLES

PROGRAM NAME	DEFINITION
INF	MAXIMUM NO-FIRE CURRENT, EQUIVALENCED TO S(3) IN COMMON BLOCK SPIRO

NOTE: The common block EEE contains only one variable, X, a frequency rejection factor calculated in SP[illegible].

5.1.33 Name: FM

DESCRIPTION

Calculates the spectrum of an FM signal.

DATA REQUIREMENTS

ARGUMENTS:

X - frequency relative to carrier

BFM - frequency break point

Y - output level

COMMON BLOCKS:

None

LOCAL VARIABLES:

None

5.1.34 Name: LOGLIN

DESCRIPTION

Performs a log-linear interpolation of spectrum

DATA REQUIREMENTS

ARGUMENTS:

F1 -lower frequency

F2 -higher frequency

S -table to be interpolated from

IFSTRT -index of first frequency in table

NPTS -number of elements in table

INPASS -initial pass flag (1 = yes, 2 = no)

IMXMN -source/receptor flag (1 = source, 2 = receptor)

GLEV -interpolated output

COMMON BLOCKS:

None

TABLE 32

LOGLIN VARIABLES

PROGRAM NAME	DESCRIPTION
FA	TEMPORARY FREQUENCY
FTEST	TEST FREQUENCY FROM TABLE
GA	TEMPORARY LEVEL
GTEST	TEST LEVEL FROM TABLE
G2	TEMPORARY LEVEL
IFLAG	FLAG INDICATING WHETHER THE PREVIOUS TEST FREQUENCY WAS BELOW F1 (0 = no, 1 = yes)
IFSTOP	INDEX OF LAST FREQUENCY IN TABLE
ITEST	INDEX OF TEST FREQUENCY FROM TABLE

5.1.35 Name: M461

DESCRIPTION

Subroutine M461 puts out a spectrum level according to MIL-STD-461 requirements to serve as an initial level for a receptor or emitter port.

DATA REQUIREMENTS

ARGUMENTS:

INBFG - narrowband/broadband flag (0=both, 1=broad, 2=narrow)

INPASS - initial pass flag (1=yes, 2=no)

IEMSU - emitter/receptor flag (1=emitter, 2=receptor)

COMMON BLOCKS:

SPIRO

TABLE 33

M461 VARIABLES

PROGRAM NAME	DEFINITION
PDBW	TRANSMITTER POWER IN dBw
PSCB	SPECTRUM DATA ARRAY FOR SIGNAL/CONTROL
PSP	SPECTRUM DATA ARRAY FOR POWER
REB	SPECTRUM DATA ARRAY FOR EQUIPMENT CASE
REN	SPECTRUM DATA ARRAY FOR EQUIPMENT CASE
RS	SPECTRUM DATA ARRAY FOR EQUIPMENT CASE
SDBUI	CALCULATED EMISSION LIMIT FOR RF EMITTER, BASED ON MIL-STD-461 TABLE
EQUIVALENCED VARIABLES:	
ESP	S(3) IN COMMON BLOCK SPIRO
IRS	IS(6) IN COMMON BLOCK SPIRO
MODSIG	IS(2) IN COMMON BLOCK SPIRO
P	S(4) IN COMMON BLOCK SPIRO

TABLE 33 (Concluded)

PROGRAM NAME		DEFINITION
EQUIVALENCE VARIABLES:		
RLOB	S(7)	IN COMMON BLOCK SPIRO
RLON	S(9)	IN COMMON BLOCK SPIRO
SEN	S(4)	IN COMMON BLOCK SPIRO
VSP	S(2)	IN COMMON BLOCK SPIRO

5.1.36 Name: M6181

DESCRIPTION

Subroutine M6181 puts out a spectrum level according to MIL-STD-6181 requirements to serve as an initial level for a receptor or emitter port.

DATA REQUIREMENTS

ARGUMENTS:

RFR1 - low end of required frequency range

INBFG - narrow band/broad band flag

INPASS - initial pass flag

IEMSU - emitter/receptor flag

COMMON BLOCKS:

SPIRO

TABLE 34

M6181 VARIABLES

PROGRAM NAME		DEFINITION
PB		BROADBAND SPECTRUM DATA ARRAY FOR POWER
PN		NARROWBAND SPECTRUM DATA ARRAY FOR POWER
REB		BROADBAND SPECTRUM DATA ARRAY FOR CASE
REN		NARROWBAND SPECTRUM DATA ARRAY FOR CASE
RS		NARROWBAND SUSCEPTIBILITY DATA ARRAY FOR CASE
SCB		BROADBAND SPECTRUM DATA ARRAY FOR SIGNAL/CONTROL
SCN		NARROWBAND SPECTRUM DATA ARRAY FOR SIGNAL/CONTROL
EQUIVALENCED VARIABLES:		
MODSIG	IS(2)	IN COMMON BLOCK SPIRO
ISR	IS(6)	IN COMMON BLOCK SPIRO

TABLE 34 (Concluded)

PROGRAM NAME	DEFINITION
P	S(4) IN COMMON BLOCK SPIRO
RLOB	S(6) IN COMMON BLOCK SPIRO
RLON	S(6) IN COMMON BLOCK SPIRO
SEN	S(4) IN COMMON BLOCK SPIRO

5.1.37 Name: M704

DESCRIPTION

Calculates the harmonic spectrum of a power line

DATA REQUIREMENTS

ARGUMENTS:

IEMSU-flag (1 = source, 2 = receptor)

COMMON BLOCKS:

SPIRO

TABLE 35

M704 VARIABLES

PROGRAM NAME	DEFINITION
V	LINE VOLTAGE (RMS) (EQUIVALENCED TO S(2) IN COMMON BLOCK SPIRO)

5.1.38 Name: NVOICE

DESCRIPTION

Calculates the spectrum of an arbitrary AM signal

DATA REQUIREMENTS

ARGUMENTS:

X - frequency relative to carrier

B - bandwidth of modulating signal

Y - output level

COMMON BLOCKS:

None

LOCAL VARIABLES:

None

5.1.39 Name: PULSE

DESCRIPTION

Subroutine PULSE calculates the power spectral density of pulse-modulated RF signals. The models include PDM/AM, PCM/AM-NRZ, PCM/AM-BIPHASE, PPM/AM, Morse telegraphy, FSK, and PAM/FM. It is assumed the carrier is tuned to the frequency closest to the frequency of interest.

DATA REQUIREMENTS

ARGUMENTS:

NTYPE - pulse type code

DFREQ - frequency relative to the carrier

COMMON BLOCKS:

SPIRO

TABLE 36

PULSE VARIABLES

PROGRAM NAME	SYMBOL	DEFINITION
D	D	NORMALIZED FREQUENCY SEPARATION BETWEEN OSCILLATORS IN FSK
DEF		FREQUENCY RELATIVE TO TONE FREQUENCY IN TELEGRAPHY
DELTA		EQUIVALENT PULSE WIDTH IN TELEGRAPHY
DF	f	FREQUENCY RELATIVE TO CARRIER
DFM	fm	FREQUENCY BREAK POINT
DFM1	fm1	FIRST FREQUENCY BREAK POINT IN TELEGRAPHY
DFM2	fm2	SECOND FREQUENCY BREAK POINT IN TELEGRAPHY
DLOW		CONSTANT EQUAL TO $4/\pi^2$
PI		CONSTANT EQUAL TO π
SIGMA		STANDARD DEVIATION OF FREQUENCY VARIATION IN PAM/FM
X	X	NORMALIZED FREQUENCY IN FSK
XM	Xm	NORMALIZED FREQUENCY BREAK POINT IN FSK

TABLE 36 (Concluded)

PROGRAM NAME	DEFINITION
EQUIVALENCED VARIABLES:	
DIFF	S(7) IN COMMON BLOCK SPIRO
EM	S(7) IN COMMON BLOCK SPIRO
FB	S(6) IN COMMON BLOCK SPIRO
FDEV	S(7) IN COMMON BLOCK SPIRO
FTONE	S(7) IN COMMON BLOCK SPIRO
P	S(4) IN COMMON BLOCK SPIRO
TAU	S(7) IN COMMON BLOCK SPIRO
WPM	S(6) IN COMMON BLOCK SPIRO

5.1.40 Name: RADAR

DESCRIPTION

Subroutine RADAR calculates the power spectral density of radar-type pulses, in which the pulse duration is much smaller than the interval between pulses so that the discrete lines may be approximated by a continuous spectrum.

DATA REQUIREMENTS

ARGUMENTS:

DFREQ - frequency relative to the carrier.

COMMON BLOCKS:

SPIRO

TABLE 37

RADAR VARIABLES

PROGRAM NAME	SYMBOL	DEFINITION
BETA		BANDWIDTH PARAMETER IN CHIRP RADAR
D	D	PULSE COMPRESSION RATIO IN CHIRP RADAR
DELTA		EFFECTIVE PULSE RISE TIME
DF	f	FREQUENCY RELATIVE TO RF CARRIER
DFA		FREQUENCY BREAK POINT IN CHIRP RADAR
DFAA		FREQUENCY BREAK POINT IN CHIRP RADAR
DFB		FREQUENCY BREAK POINT IN CHIRP RADAR
DF1		FREQUENCY BREAK POINT IN CHIRP RADAR
DF2		FREQUENCY BREAK POINT IN CHIRP RADAR
EM	m	LOG LINEAR SLOPE IN CHIRP RADAR
G2		TEMPORARY VARIABLE IN CHIRP RADAR
IQ		SYMMETRY FLAG IN CHIRP RADAR
NTYPE		PULSE TYPE (RECTANGULAR, ETC.)

TABLE 37 (Concluded)

PROGRAM NAME		DEFINITION
PI		CONSTANT EQUAL TO π
SIG		FREQUENCY "STANDARD DEVIATION" IN GAUSSIAN PULSE
TAUB		PULSE WIDTH IN CHIRP RADAR
TRF		AVERAGE RISE TIME IN CHIRP RADAR
T1		TEMPORARY VARIABLE
T2		TEMPORARY VARIABLE
EQUIVALENCED VARIABLES		
FB	S(6)	IN COMMON BLOCK SPIRO
ISIG	IS(5)	IN COMMON BLOCK SPIRO
P	S(4)	IN COMMON BLOCK SPIRO
R	S(10)	IN COMMON BLOCK SPIRO
TAU	S(7)	IN COMMON BLOCK SPIRO
TF	S(9)	IN COMMON BLOCK SPIRO
TR	S(8)	IN COMMON BLOCK SPIRO

5.1.41 Name: SCARFE

DESCRIPTION

Subroutine SCARFE chooses the appropriate emission model subroutine to calculate the maximum required emission level over some frequency interval. There are separate routines for CW, pulse-modulated RF, radar, continuously modulated RF, and signal-control ports. Each spectrum routine puts out a broad band and narrow band emission level and an effective bandwidth.

DATA REQUIREMENTS

ARGUMENTS:

None

COMMON BLOCKS:

SPIRO

TABLE 38

SCARFE VARIABLES

PROGRAM NAME	DEFINITION
NTYPE	MODULATION CODE
ISR - IS(6)	IN COMMON BLOCK SPIRO
MOD - IS(2)	IN COMMON BLOCK SPIRO
NUNIT - IS(4)	IN COMMON BLOCK SPIRO

5.1.42 Name: SCARFR

DESCRIPTION

Subroutine SCARFR calculates the required susceptibility spectrum of a signal, control, or RF receptor.

DATA REQUIREMENTS

ARGUMENTS:

None

COMMON BLOCKS:

SPIRO

TABLE 39

SCARFR VARIABLES

PROGRAM NAME	DEFINITION
EQUIVALENCED VARIABLES:	
A - S(4)	IN COMMON BLOCK SPIRO
BWC - S(5)	IN COMMON BLOCK SPIRO
ISR - IS(6)	IN COMMON BLOCK SPIRO
NUNIT - IS(5)	IN COMMON BLOCK SPIRO
SEN - S(4)	IN COMMON BLOCK SPIRO

5.1.43 Name: SIGCON

DESCRIPTION

Subroutine SIGCON calculates the power spectral density of signal and control emitters. The models include the pulse modulation schemes without an RF carrier, and also include square waves, trapezoidal pulse train, triangular pulse train, exponential spikes, sawtooth, damped sinusoid, voice, and clipped voice.

DATA REQUIREMENTS

ARGUMENTS:

NTYPE - modulation type

COMMON BLOCKS:

SPIRO

TABLE 40

SIGCON VARIABLES

PROGRAM NAME	SYMBOL	DEFINITION
DELTA		EQUIVALENT PULSE WIDTH IN TELEGRAPHY
DF	f	FREQUENCY RELATIVE TO AUDIO TONE FREQUENCY IN TELEGR
DF1		FREQUENCY BREAK POINT
DF2		FREQUENCY BREAK POINT
F	f	FREQUENCY
FMAX	f_{MAX}	FREQUENCY OF PEAK EMISSION LEVEL IN DAMPED SINUSOID
PI		CONSTANT EQUAL TO
X		NORMALIZED FREQUENCY
Y		TEMPORARY VARIABLE
EQUIVALENCED VARIABLES:		
A	S(4)	IN COMMON BLOCK SPIRO
ALPHA	S(8)	IN COMMON BLOCK SPIRO
EM	S(7)	IN COMMON BLOCK SPIRO

TABLE 40(Concluded)

PROGRAM NAME	DEFINITION
FB	S(6) IN COMMON BLOCK SPIRO
FTONE	S(7) IN COMMON BLOCK SPIRO
FO	S(7) IN COMMON BLOCK SPIRO
NSIG	IS(5) IN COMMON BLOCK SPIRO
TAU	S(7) IN COMMON BLOCK SPIRO
TR	S(8) IN COMMON BLOCK SPIRO
WPM	S(6) IN COMMON BLOCK SPIRO

5.1.44 **Name:** VOICE

DESCRIPTION

Calculates the spectrum of a voice signal

DATA REQUIREMENTS

ARGUMENTS:

X - frequency relative to carrier or DC

I - RF flag (0 = no, 1 = yes)

Y - output level

COMMON BLOCKS:

None

LOCAL VARIABLES:

None

5.2 IDIPR ARRAYS AND COMMON BLOCKS

5.2.1 IDIPR Data Arrays

During the decoding of the input data, the individual parameters on each card are stored into two dimensioned arrays, an integer array and a floating point array. The parameters as they are given on the input cards are described in Tables 144-148 in Section 6. Parameters which are alphanumeric code words have integer values assigned, and parameters which are user-supplied alphanumeric identifications of components have numeric codes assigned. These assigned integer values, along with counters, are stored in the integer array associated with the card type. All parameters which have input numeric values are stored in the floating point array of the card type. These arrays are used for data communication among the routines of IDIPR, and they are written to the disk or tape files, defined in Tables 149-156, which are read by TART. Hence, the input is transmitted to TART by means of these arrays, although not necessarily by the same program mnemonic.

These two arrays for each input data card, their dimensions, their IDIPR labelled COMMON assignment, and a description of each word in the array are given below in Input Data Arrays, Tables 41-55. The contents of the integer and floating point arrays are described in these tables in terms of input data, often in an abbreviated form. It is recommended that the description of input data in Section 6 be read prior to the description of the IDIPR data arrays, particularly the description of input data formats in Tables 144-148. For example, the description of input data format in Table 147 should be read prior to reading the equipment and floating point integer arrays in Table 46.

Any given IDIPR run may involve from 1 to 3 files of input data, the PIF, the old ISF, and the new ISF. As the data on each of these files is the same basic set of data, different names have been used during the update process. A list of the program mnemonics used when writing or reading the three files in IDIPR is given in Table 56.

In addition to the input data arrays, certain arrays are defined in BLOCK DATA, such as valid keywords and valid alpha code words. Other arrays are generated during IDIPR processing, such as arrays of change codes which tell what types of data has been changed on modify runs. These arrays are given in Tables 57-60.

A listing of these tables is given below followed by the tables:

TABLE	INPUT DATA ARRAYS
41	Waiver Analysis Arrays
42	Aperture Data Arrays
43	Antenna Arrays
44	Filter Arrays
45	Wire Characteristics Table Arrays

TABLE 41

WAIVER ANALYSIS ARRAYS

1. INTEGER ARRAY

FILE	PROGRAM MNEMONIC	DIMENSION	LABELED COMMON WHERE FOUND
ARRAY	IWA(IX,I) IX = index of W.A. card	(50,3)	CEARV

I	DEFINITION	
1	subsystem ID	(in numeric code)
2	equipment ID	(in numeric code)
3	port ID	(in numeric code)

2. FLOATING POINT ARRAY

FILE	PROGRAM MNEMONIC	DIMENSION	LABELED COMMON WHERE FOUND
ARRAY	FWA(IW,I) IX = index of W.A. card	(50,6)	CEARV

I	MATH SYMBOL	DEFINITION
1	fl_s	lowest frequency of range for source
2	$f2_s$	highest frequency of range for source
3	d_s	displacement for source
4	fl_r	lowest frequency of range for receptor
5	$f2_r$	highest frequency of range for receptor
6	d_r	displacement for receptor

TABLE 42

APERTURE DATA ARRAYS

1. INTEGER ARRAY

FILE	PROGRAM MNEMONIC	DIMENSION	LABELED COMMON WHERE FOUND
PIF	IAPRM(IX,I)	10,2	PID
ISF	IAPPM2(IX,I) IX = aperture index	10,2	ISF

I	DEFINITION
1	ID (in numeric code)
2	wing location code

NO	0	not on wing
BOT	2	bottom of wing
TOP	3	top of wing
FWD	4	forward edge of wing
AFT	5	aft edge of wing
TIP	6	tip of wing

2. FLOATING POINT ARRAY

FILE	PROGRAM MNEMONIC	DIMENSION	LABELED COMMON WHERE FOUND
PIF	APPARM(IANT,I)	10,5	PID
ISF	APPRM2(IANT,I) IANT = aperture index	10,5	ISF

I	DEFINITION	
1	b_ℓ	(butt line)
2	w_ℓ	(water line)
3	fs	(fuselage station)
4	width	
5	length	

TABLE 43

ANTENNA ARRAYS

1. INTEGER ARRAY

FILE	PROGRAM MNEMONIC	DIMENSION	LABELED COMMON WHERE FOUND
PIF	IAPM(IANT,I)	50,4	PID
ISF	IAPM2(IANT,I) IANT = antenna index	50,4	ISF

I	DEFINITION
1	antenna ID (in numeric code)
2	antenna model code
3	no. subparameters
4	polarization code

Polar Code

HZ	1	(Horizontal)
VE	2	(Vertical)
CI	3	(Circular)

Antenna Model Code

1 DIPOLE
2 WHIP
3 SLOT
4 LOOP
5 PARDSH (parabolic dish)
6 LGPER (log periodic)
7 HORN
8 PSDAR (phased array)
9 SPIRAL

2. FLOATING POINT ARRAY

FILE	PROGRAM MNEMONIC	DIMENSION	LABELED COMMON WHERE FOUND
PIF	APARM(IANT,I)	50,7	PID
ISF	APRM2(IANT,I)	50,7	ISF

Model Code	1-3	4	5-9	
I = 1	ℓ	d	d	antenna diameter or length
2			G_{mB}	main beam gain
3			θ_B	vertical half-beamwidth of main beam
4			ϕ_B	horizontal half-beamwidth of main beam
5			G_{msl}	sidelobe gain
6			ϕ_{sl}	horizontal half beam of sidelobe
7			G_{BL}	backlobe gain

TABLE 44

FILTER ARRAY

1. INTEGER ARRAY

FILE	PROGRAM MNEMONIC	DIMENSION	LABELING COMMON WHERE FOUND
PIF	IFLT(IFTR,I)	20,4	PID
ISF	IFLT2(IFTR,I) IFTR = filter index	20,4	ISF

I	DEFINITION
1	filter ID (in numeric code)
2	type code
3	no. stages
4	no. subparameters

2. FLOATING POINT ARRAY

FILE	PROGRAM MNEMONIC	DIMENSION	LABELING COMMON WHERE FOUND
PIF	FPARM	20,6	PID
ISF	FPRM2(IFTR,I) IFTR = filter index	20,6	ISF

I	SGTUN =1	TRCOUP =2	BUTTER =3	LOWPAS =5	HIPAS =6	HPASS =7	BRJCT =8
1	f_o	f_o	f_o	f_u	f_1	f_1	f_1
2	B	-	B	-	-	f_μ	f_u
3	γ	γ	γ	γ	γ	γ	γ
4	isol	isol	isol	isol	isol	isol	isol
5	-	Q	-	-	-	-	-
6	-	m	-	-	-	-	-

TABLE 45

WIRE CHARACTERISTICS TABLE ARRAYS

1. INTEGER ARRAY

FILE	PROGRAM MNEMONIC	DIMENSION	LABELING COMMON WHERE FOUND
PIF	IWCT(IWCT,I)	20,3	PID
ISF	IWCT2(IWCT,I) IWCT = Wire index	20,3	ISF

I	DEFINITION
1	wire type designation ID (in numeric code)
2	shield code
3	no. twisted wires

Shield Code

SH	1	shielded
UN	2	unshielded
DS	3	double shielded

2. FLOATING POINT ARRAY

FILE	PROGRAM MNEMONIC	DIMENSION	LABELING COMMON WHERE FOUND
PIF	WCT(IWCT,I)	20,10	PID
ISF	WCT2(IWCT,I) IWCT = wire index	20,10	ISF

I	DEFINITION
1	conductor diameter
2	conductivity
3	insulation thickness
4	insulation dielectric constant
5	internal diameter of shield if shielded
6	thickness of shield if shielded
7	jacket-thickness of shield if shielded
8	shield-to-conductor capacitance
9	second shield diameter
10	second shield thickness

TABLE 46

EQUIPMENT ARRAYS

1. INTEGER ARRAY

FILE	PROGRAM MNEMONIC	DIMENSION	LABELING COMMON WHERE FOUND
PIF	IEPARM(I)	6	PID
ISF	IEPRM2(I)	6	ISF

I	DEFINITION
1	equipment ID (in numeric code)
2	subsys ID (in numeric code)
3	spec code
4	fixadj code
5	compartment ID (in numeric code)
6	class code

SPEC CODE

M4	1
M6	2

FIXADJ CODE

FI	0
AD	1

CLASS CODE

UN	0
CO	1
SE	2
TO	3

2. FLOATING POINT ARRAY

FILE	PROGRAM MNEMONIC	DIMENSION	LABELING COMMON WHERE FOUND
PIF	EPARM(I)	3	PID
ISF	EPRM2(I)	5	ISF

I	DEFINITION
1	bl (butt line)
2	wl (water line)
3	fs (fuselage station)
4	unused
5	unused

TABLE 47

PORT ARRAYS

1. INTEGER ARRAY

FILE	PROGRAM MNEMONIC	DIMENSION	LABELED COMMON WHERE FOUND
PIF	IPPARM(IPRT,I)	15,10	PID
ISF	IPPRM2(IPRT,I) IPRT = Port index	15,10	IST

I	WIRE	ANTENNA
1	Port ID	Port ID
2	Conn. code	Conn. code
3	Bundle ID	Antenna ID
4	Wire ID	Wing location code (See Aperture Table 42)
5	Bundle point ID	-
6	Reference wire	-
7	Shield term code	-
8	Aperture exposed code (APEXP)	-
9	Filter ID	Filter ID
10	SO/RC type code	SO/RC type code

NOTE: All ID's in numeric code

CONN. CODE (2)

ANT	1
WIRE	2
CASE	3

APEXP. CODE (8)

NO	0
EXP	1

REF WIRE (6)

BAL	0201120000
SHD	1908040000
GND	0718040000
UNBAL	2114020112

SO/RC TYPE (10)

SOURCE	1
RCEPT	2
BOTH	3

SH. TERM (7)

NO	0	(none)
OP	1	(open)
GN	2	(grounded)
OO	3	(open-open)
OG	4	(open-grounded)
GO	5	(grounded-open)
GG	6	(grounded-grounded)

TABLE 47 (CONCLUDED)

2. FLOATING POINT ARRAY

FILE	PROGRAM MNEMONIC	DIMENSION	LABELED COMMON WHERE FOUND
PIF	PPARM (IPRT,I)	15,10	PID
ISF	PPARM2(IPRT,I) IPRT = Port index	15,10	ISF

I	WIRE	ANTENNA		
1	-	θ_o		beam peak coordinates
2	-	ϕ_o		
3	-	c_1		location coordinates
4	-	c_2		
5	-	c_3		
6	r_ℓ		resistance	port termination impedance
7	c_ℓ		capacitance	
8	ℓ_ℓ		inductance	
9	sdfs (spectrum displacement factor for source)			
10	sdfr (spectrum displacement factor for receptor)			

TABLE 48

RF SOURCE AND RECEPTOR DATA ARRAYS

1. INTEGER ARRAY: RF PORT

FILE	SOURCE MNEMONIC	RECEPTOR MNEMONIC	DIMENSION	LABELLED COMMON WHERE FOUND
PIF	ISO(IPRT,I)	IRO(IPRT,I)	15,6	PID
ISF	ISO2(IPRT,I)	IRO2(IPRT,I)	15,6	ISF
	IPRT = Port index			

I	DEFINITION
1	Port ID (in numeric code)
2	MODSIG (modulation type code, integer between 2 and 900)
3	No. subparameters; if SPECT, no. spectrum points
4	No. harmonics (0 for receptor)
	MODSIG = 200 (radar pulse) / MODSIG = 301 - 305
5	PTYPE (pulse type code) / SIG CODE (modulating signal type code)
6	SR Code (source/receptor type code)

MODSIG	
CW	2
PDM	101
NRZ	102
BPP	103
PPM	104
TEL	105
FSK	106
PAM	107
RADAR	200
AM	301
DS	302
LS	303
US	304
FM	305
LO	400
SPECT	900

PTYPE	
RE	110
TPZD	111
COSQD	118
GAUSS	119
CHIRP	120

SIG CODE	
VO	115
CV	116
NO	117

SR CODE	
RF	1
PO	2
S or C	3 or 4
FED	5
CASE	6

TABLE 48 (CONCLUDED)

2. FLOATING POINT ARRAY: RF PORT

FILE	SOURCE MNEMONIC	RECEPTOR MNEMONIC	DIMENSION	LABELED COMMON WHERE FOUND
PIF	SRCE(IPRT,I)	RPARM(IPRT,I)	15,41	PID
ISF	SRCE2(IPRT,I)	RPRM2(IPRT,I)	15,41	ISF
	IPRT = Port Index			

I	DEFINITION	
1	adjlim	(spectrum adjustment limit)
2	f_ℓ	(lowest operating frequency)
3	f_h	(highest operating frequency)
4	p or s	(power if source; sensitivity if receptor)
5	bwc	(bandwidth)

MODSIG

	CW 2	PDM/NRZ 101-2	BPB 103	PPM 104	TEL 105	FSK 106	PAM 107	RAD 200	AM 301	DSB,LSSB or USSB 302-4	FM 305	LO 400	[illegible] 900
6	-	rb	rb	rb	wpm	tb	-	rb	b	b	b	LO_m	f_1
7			em	t	ftone	diff	df	t	em		df	LO[illegible]	g_1
8								tr					[illegible]
9								tf					g_2
10								pcr					.
11		h_1 (source) or f_{if} (receptor)											f_n
.		.											g_n
.		.											h_1 (srce)
.		.											f_{if} (rec[illegible])
20		h_{10}											.
.													.
.													.
35													h_{10}

TABLE 49

POWER SOURCE AND RECEPTOR DATA ARRAYS

1. INTEGER ARRAY: POWER PORT

FILE	SOURCE MNEMONIC	RECEPTOR MNEMONIC	DIMENSION	LABELED COMMON WHERE FOUND
PIF	ISO(IPRT,I)	IRO(IPRT,I)	15,6	PID
ISF	ISO2(IPRT,I)	IRO2(IPRT,I)	15,6	ISF

IPRT = Port Index

I	DEFINITION
1	Port ID (in numeric code)
2	RS code (initial spectrum)
3	If SPEC, number of user spectrum points; otherwise, equals 0
4	highest harmonic
5	number of phases
6	SR code (source/receptor type code)

RS CODE	
M461	1
M6181	2
M704	3
SPEC	900

SR CODE	
RF	1
PO	2
S/C	3/4
EED	5
CASE	6

2. FLOATING POINT ARRAY

FILE	SOURCE MNEMONIC	RECEPTOR MNEMONIC	DIMENSION	LABELED COMMON WHERE FOUND
PIF	SRCE(IPRT,I)	RPARM(IPRT,I)	15,41	PID
ISF	SRCE2(IPRT,I)	RPRM2(IPRT,I)	15,41	ISF

IPRT = Port index

I	DEFINITION	
1	adjlim (spectrum adjustment limit)	
2	v	(voltage)
3	f	(fraquency)
4	-	
5	-	
6	f_1	(frequency)
7	s_1	(spectrum level)
8	f_2	
9	s_2	
.	.	
.	.	
.	.	

TABLE 50

SIGNAL/CONTROL SOURCE AND RECEPTOR DATA ARRAYS

1. INTEGER ARRAY: SIGNAL/CONTROL PORTS

FILE	SOURCE MNEMONIC	RECEPTOR MNEMONIC	DIMENSION	LABELED COMMON WHERE FOUND
PIF	ISO(IPRT,I)	IRO(IPRT,I)	15,6	PID
ISF	ISO2(IPRT,I) IPRT = Port index	IRO2(IPRT,I)	15,6	ISF

I	DEFINITION
1	Port ID
2	MODSIG (modulation type code, integer between 101 and 900)
3	Number of subparameters (If MODSIG = 900, number of spectrum points)
4	Units code of amplitude
5	-
6	SR code (source/receptor type code)

MODSIG CODE

PDM	101
NRZ	102
BPP	103
PPM	104
TEL	105
PAM	107
ESPIKE	108
RECT	110
TPZD	111
TRIANG	112
SAWTH	113
DM	114
VO	115
CV	116
SP	900

SR CODE

RF	1
PO	2
S/C	3/4
EED	5
CASE	6

Units Code

VL	2
AM	301

TABLE 50 (CONCLUDED)

2. FLOATING POINT ARRAY: SIGNAL/CONTROL PORT

FILE	SOURCE MNEMONIC	RECEPTOR MNEMONIC	DIMENSION	LABELED COMMON WHERE FOUND
PIF	SRCE(IPRT,I)	RPARM(IPRT,I)	15,41	PID
ISF	SRCE2(IPRT,I)	RPRM2(IPRT,I)	15,41	ISF

IPRT = Port index

I	DEFINITION
1	adjlim (spectrum adjustment limit)
2	fl (lowest required frequency)
3	fh (highest required frequency)
4	a (voltage or current)
5	bw (bandwidth)

MODSIG

	101	102	103	104	105	107-110	111	112-113	114	115	116	900
6	rb	rb	rb	rb	wpm	rb	rb	rb	rb	-	-	f_1
7			em	t	ftone	t	t	t	fr			g_1
8							tr		ft			.
9												.
10												.
11												f_n
.												g_n
.												
.												
35												

TABLE 51

EED AND CASE SOURCE AND RECEPTOR DATA ARRAYS

1. INTEGER ARRAY: EED AND CASE PORT

FILE	SOURCE MNEMONIC	RECEPTOR MNEMONIC	DIMENSION	LABELED COMMON WHERE FOUND
PIF	ISO(IPRT,I)	IRO(IPRT,I)	15,6	PID
ISF	ISO2(IPRT,I)	IRO2(IPRT,I)	15,6	ISF

IPRT = Port index

I	EED DEFINITION	CASE DEFINITION
1	Port ID	Port ID=CASE
2	-	No. pts. in narrowband spect (0 if MILSPEC)
3	No. pts. in fn.	No. pts. in broadband spect (0 if MILSPEC)
4	-	-
5	-	-
6	SR code	SR code (See RF)

2. FLOATING POINT ARRAY: EED AND CASE PORT

FILE	SOURCE MNEMONIC	RECEPTOR MNEMONIC	DIMENSION	LABELED COMMON WHERE FOUND
PIF	SRCE(IPRT,I)	RPARM(IPRT,I)	15,41	PID
ISF	SRCE2(IPRT,I)	RPRM2(IPRT,I)	15,41	ISF

IPRT = Port index

I	EED DEFINITION	CASE DEFINITION	
1	adjlim	adjlim	
2	Pnf	f_1	(narrowband spectrum if present;
3	i_{nf}	g_1	if no narrowband present, and broadband spectrum is present,
4	f_1	.	this is broadband)
5	r_1	.	
6	x_1		
7	.	.	
8	.	.	
9	.	f_{NPTNB}	
10		g_{NPTNB}	
.		f_1	(BB spectrum is NB spectrum
.		g_1	present)
41		.	

TABLE 52

BUNDLE ARRAY

1. INTEGER ARRAY

FILE	PROGRAM MNEMONIC	DIMENSION	LABELED COMMON WHERE FOUND
PIF	IBPARM(I)	3	PID
ISF	IBPRM2(I)	3	ISF

I	DEFINITION
1	Bundle ID (in numeric code)
2	No. of wires in bundle
3	No. of node points in bundle

2. FLOATING POINT ARRAY - none

TABLE 51

EED AND CASE SOURCE AND RECEPTOR DATA ARRAYS

1. INTEGER ARRAY: EED AND CASE PORT

FILE	SOURCE MNEMONIC	RECEPTOR MNEMONIC	DIMENSION	LABELED COMMON WHERE FOUND
PIF	ISO(IPRT,I)	IRO(IPRT,I)	15,6	PID
ISF	ISO2(IPRT,I)	IRO2(IPRT,I)	15,6	ISF
	IPRT = Port index			

I	EED DEFINITION	CASE DEFINITION
1	Port ID	Port ID=CASE
2	-	No. pts. in narrowband spect (0 if MILSPEC)
3	No. pts. in fn.	No. pts. in broadband spect (0 if MILSPEC)
4	-	-
5	-	-
6	SR code	SR code (See RF)

2. FLOATING POINT ARRAY: EED AND CASE PORT

FILE	SOURCE MNEMONIC	RECEPTOR MNEMONIC	DIMENSION	LABELED COMMON WHERE FOUND
PIF	SRCE(IPRT,I)	RPARM(IPRT,I)	15,41	PID
ISF	SRCE2(IPRT,I)	RPRM2(IPRT,I)	15,41	ISF
	IPRT = Port index			

I	EED DEFINITION	CASE DEFINITION	
1	adjlim	adjlim	
2	Pnf	f_1	(narrowband spectrum if present; if no narrowband present, and broadband spectrum is present, this is broadband)
3	i_{nf}	g_1	
4	f_1	.	
5	r_1	.	
6	x_1		
7	.	.	
8	.	.	
9	.	f_{NPTNB}	
10		g_{NPTNB}	
.		f_1	(BB spectrum is NB spectrum present)
.		g_1	
41		.	

TABLE 54

BUNDLE SEGMENTS ARRAYS

1. INTEGER ARRAY

FILE	PROGRAM MNEMONIC	DIMENSION	LABELED COMMON WHERE FOUND
PIF	IBEP(I)	41	PID
ISF	IBEP2(I)	41	ISF

I	DEFINITION	
1	number of segments	
2	ID of point 1	repeated
3	ID of point 2	up to
4	compartment ID	10 times
5	aperture ID	
.		
.		
.		

NOTE: All ID's are in numeric code

2. FLOATING POINT ARRAY

FILE	PROGRAM MNEMONIC	DIMENSION	LABELED COMMON WHERE FOUND
PIF	BEP(I)	20	PID
ISF	BEP2(I)	20	ISF

I	DEFINITION	
1	ℓ_1	(length seg. 1)
2	h_1	(length seg. 1)
3	ℓ_2	
4	h_2	
5	.	
	.	
	.	

TABLE 55

WIRE ARRAY

1. INTEGER ARRAY

FILE	PROGRAM MNEMONIC	DIMENSION	LABELED COMMON WHERE FOUND
PIF	IWPARM(IWIR,I)	50,14	PID
ISF	IWPRM2(IWIR,I) IWIR = Wire index	50,14	ISF

I	DEFINITION
1	number of points through which wire passes
2	wire ID
3	name of wire in wire char. table
4	Pt_1 ID
.	
.	
.	
14	Pt_{11} ID

Note: All ID's are in numeric code

2. FLOATING POINT ARRAY - none

TABLE 56

MNEMONICS USED BY FILES FOR INPUT DATA

DESCRIPTION	OLD ISF	PIF	NEW ISF
No. of Antennas	NANT2	NANT	NANT2
No. of Filters	NFTR2	NFTR	NFTR2
No. in Wire Char. Table	NWCT2	NWCT	NWCT2
No. in Title Array	ITITL2	ITITL	ITITL
Title Array	TITL2	TITLE	TITL2
No. in Remarks Array	IRMRK2	IRMRK	IRMRK
Remarks Array	RMRK2	RMRK	RMRK
System Type	ISYS2	ISYSTP	ISYSTP
No. of Apertures	NAPR2	NAPR	NAPR2
System Parameters - Longitude	SYS2(1)	SLON	SLON
System Parameters - Latitude	SYS2(2)	SLAT	SLAT
System Parameters - Altitude	SYS2(3)	ALT	ALT
Adjustment Safety Margin	SYS2(4)	ASM	ASM
EMI Margin Print Limit	SYS2(5)	EMPL	EMPL
Ground Parameters - Conductivity	SYG2(1)	SIGMA	SIGMA
Ground Parameters - Permitivity	SYG2(2)	EPSR	EPSR
Not Used	SYG2(3)	THETA	THETA
Not Used	SYG2(4)	RADIUS	RADIUS
Fuselage Parameters - Conical Nose Limit	SYF2(1)	FSN	FSN
Fuselage Parameters - Fuselage or Radius	SYF2(2)	RHOF	RHOF
Fuselage Parameters - Core Radius	SYF2(3)	RHOC	RHOC

TABLE 56 (CONTINUED)

DESCRIPTION	OLD ISF	PIF	NEW ISF
Fuselage Parameters - wl_c	SYF2(4)	WLC	WLC
Fuselage Parameters - wl_{BOT}	SYF2(5)	WLBOT	WLBOT
Wingroot Parameters - b_1	SYW2(1)	WRBL	WRBL
Wingroot Parameters - w_1	SYW2(2)	WRWL	WRWL
Wingroot Parameters - f_{s_f}	SYW2(3)	WRFFS	WRFFS
Wingroot Parameters - f_{s_a}	SYW2(4)	WRAFS	WRAFS
Wingtip Parameters - b_1	SYW2(5)	WTBL	WTBL
Wingtip Parameters - w_1	SYW2(6)	WTWL	WTWL
Wingtip Parameters - f_{s_f}	SYW2(7)	WTFFS	WTFFS
Wingtip Parameters - f_{s_a}	SYW2(8)	WTAFS	WTAFS
Model Type Code	MDL2	MDL	MDL
Aperture Integer Array	IAPPM2	IAPRM	IAPPM2
Aperture Floating Point Array	APPRM2	APPARM	APPRM2
Antenna Integer Array	IAPM2	IAPM	IAPM2
Antenna Floating Point Array	APRM2	APARM	APRM2
Filter Integer Array	IFLT2	IFLT	IFLT2
Filter Floating Point Array	FFRM2	FPARM	FPRM2
Wire Char. Table Integer Array	IWCT2	IWCT	IWCT2
Wire Char. Table Floating Point Array	WCT2	WCT	WCT2
Equipment Index	IEQ2	IEQ1	IEQ
Number of Ports	NPORT2	NPORT1	NPRT
Equipment Integer Array	IEPRM2	IEPARM	IEPRM2
Equipment Floating Point Array	EPRM2	EPARM	EPRM2

TABLE 56 (CONTINUED)

DESCRIPTION	OLD ISF	PIF	NEW ISF
No. Frequencies Per Octave (User Supplied)	NFQO2	NFQO	NFQO2
No. Frequencies in User Supplied Freq. Table	NFQU2	NFQU	NFQU2
No. Frequencies used for Analysis	NFRQ	-	NFRQ
Maximum No. Frequencies (User Supplied)	NFQMX	NFQMAX	NFQMX
Highest Frequency	FHI2	FHI	FHI2
Lowest Frequency	FLO2	FLO	FLO2
User Supplied Freq. Table	FQTBL2	FQTBL	FQTBL2
Freq. Table Generated from User Inputs or Defaults	FRQTBL	-	FTQTBL
Minimum Freq for Port Types	IFMIN	-	IFMIN
Maximum Freq. for Port Types	IFMAX	-	IFMAX
Port Integer Array	IPPRM2	IPPARM	IPPRM2
Port Floating Point Array	PPARM2	PPARM	PPARM2
Source Integer Array	ISO2	ISO	ISO2
Source Floating Point Array	SRCE2	SRCE	SRCE2
Receptor Integer Array	IRO2	IRO	IRO2
Receptor Floating Point Array	RPRM2	RPARM	RPRM2
Bundle Index	IWB2	IWB	IWB2
Bundle Array	IBPRM2	IBPARM	IBPRM2
Bundle Segment	IBEP2	IBEP	IBEP2
Bundle Points Integer Array	IBPT2	IBPTS	IBPT2

TABLE 56 (CONCLUDED)

DESCRIPTION	OLD ISF	PIF	NEW ISF
Bundle Points Floating Point Array	BPTC2	BPTCO	BPTC2
Bundle Segments Floating Point Array	BEP2	BEP	BEP2
Wire Array	IWPRM2	IWPARM	IWPRM2

TABLE 57

ICHG VALUES FOR PORT MODIFICATIONS

TYPE OF MODIFICATION	ICHG VALUE
o Port deleted	-1
o No change to port	0
o Port added	1
o Only change is port data	2
o Change to source (SO) or receptor (RC) data	3 - 18 As given below

TYPE OF SO/RC MODIFICATION M=MODIFY, A=ADD, -=NO CHANGE		PORT DATA CHANGED ICHG VALUE	PORT DATA NOT CHANGED ICHG VALUE
SO is M	RC is M	3	11
SO is M	RC is A	4	12
SO is A	RC is M	5	13
SO is A	RC is A	6	14
SO is A	RC is -	7	15
SO is M	RC is -	8	16
SO is -	RC is A	9	17
SO is -	RC is M	10	18

TABLE 58

RELATIONSHIP OF ICHG TO MODSX

ICHG	MODSX
-1	-
0	-
1-14	3
15-16	1
17-18	2

TABLE 59

KEYWORDS, MODIFY CODES AND DELETE CODES

KEYWORD (KC)	USER ALPHA SYMBOL	ABBREVIATION	LOCATION IN ALPHA ARRAY	NO. PARAMETERS FOR KEYWORD*	MODIFY CODE	NO. DELETES	ID OF DELETE
1	TITLE	TI	0	1	-		
2	REMARK	RE	0	1	-		
3	LIST	LI	1	2	-		
4	OUTPUT	OU	4	1	-		
5	SYSTEM	SY	6	6	MOD5		
6	FUSELAGE	FU	9	6	MOD6		
7	WNGRT	WN	0	4	MOD7		
8	WGTIP	WG	0	4	MOD8		
9	APER	AP	11	7	MOD9 (10)	ND9	IDEL9 (10)
10	SUBSYS	SU	0	1	MOD10	ND10	IDEL10 (40)
11	EQPT	EQ	17	8	MOD11	ND11	IDEL11 (40)
12	PORT	PO	12	-1	MOD12 (15)	ND12	IDEL12 (16)
13	FILTER	FI	35	4	MOD13 (20)	ND13	IDEL13 (20)
14	SOURCE	SO	43	-4	MOD14 (15)	ND14	IDEL14 (16)
15	RCEPT	RC	43	-4	MOD15 (15)	ND15	IDEL15 (16)
16	ANTENA	AN	83	4	MOD16 (50)	ND16	IDEL16 (50)
17	BUNDLE	BU	0	1	MOD17	ND17	IDEL17 (40)
18	BSEG	BS	0	-5	MOD18	ND18	IDEL18 (50)
19	WIRE	WI	0	-4	MOD19 (50)	ND19	IDEL19 (50)
20	EFQ	EF	0	-2	MOD20		
21	WRTBL	WR	95	-7	MOD21 (25)	ND21	IDEL21 (20)
22	EODATA	EO	0	0	-		
23	BPTS	BP	0	-8	MOD23	ND23	IDEL23 (50)
24	FREQ	FR	0	3	MOD24		
25	FQTBL	FQ	0	-1	MOD25		
26	EXEC	EX	98	-1	-		
27	OEFV	OE	0	-2	MOD27		
28	IEFL	IE	0	-2	MOD28		
29	WAVER	WA	0	9	-		
30	ETOD	ET	0	0	-		
-	COMMENT	CO	0	0	-		

* If number of parameters is negative, the number is variable and the integer gives the minimum number acceptable.

TABLE 60

ALPHANUMERIC CODE WORDS BY KEYWORDS

KEYWORD CODE	KEYWORD	ABBREVIATION	INDEX IN ALPHA ARRAY	ALPHA NUMERIC PARAMETERS	ABBREVIATION	ASSIGNED VALUE
1	TITLE	TI	-	-	-	-
2	REMARK	RE	-	-	-	-
3	LIST	LI	1	NONEW	NO	0
			2	NEW	NE	1
			3	OLD	OL	1
4	OUTPUT	OU	4	NOISF	NO	0
			5	ISF	IS	1
5	SYSTEM	SY	6	AIR	AI	1
			7	GROUND	GR	2
			8	SPACE	SP	3
6	FUSLGE	FU	9	FLAT	FL	1
			10	ROUND	RO	0
7	WNGRT	WN	-	-	-	-
8	WGTIP	WG	-	-	-	-
9	APER	AP	11	NOW	NO	0
			12	BOT	BO	2
			13	TOP	TO	3
			14	FWDEDG	FW	4
			15	AFTEDG	AF	5
			16	TIP	TI	6
10	SUBSYS	SU	-	-	-	-
11	EQPT	EQ	17	M461A	M4	1
			18	M6181D	M6	2
			19	FIX	FI	0
			20	ADJUST	AD	1
			21	CONF	CO	1
			22	SECRET	SE	2
			23	TOPSEC	TO	3
			24	NONE	NO	0
12	PORT	PO	*24	NO	NO	0
			25	WIRE	WI	2
			26	ANTENA	AN	1
			27	SH	SH	1
			28	OPN	OP	1
			29	GND	GN	2
			*24	NO	NO	0
			30	EX	EX	1
			31	OO	OO	3
			32	OG	OG	4
			33	GO	GO	5
			34	GG	GG	6
13	FILTER	FI	35	SGTUN	SG	1
			36	TRCOUP	TR	2
			37	BUTTER	BU	3
			38	SPARE	-	-

* Value already appears for another keyword or parameter and is not duplicated

TABLE 60 (CONTINUED)

KEYWORD CODE	KEYWORD	ABBREVIATION	INDEX IN ALPHA ARRAY	ALPHA NUMERIC PARAMETERS	ABBREVIATION	ASSIGNED VALUE
			39	LOWPAS	LO	5
			40	HIPAS	HI	6
			41	BPASS	BP	7
			42	BRJCT	BR	8
14	SOURCE	SO	43	RF	RF	1
15	RCEPT	RC	44	POWER	PO	2
			45	SIGNAL	SI	3
			46	CNTRL	CN	4
			47	EED	EE	5
			48	CASE	CA	6
			49	LO	LO	400
			50	CW	CW	2
			51	FSK	FS	106
			52	RADAR	RA	200
			53	DSBSC	DS	302
			54	LSSB	LS	303
			55	USSB	US	304
			56	FM	FM	305
			57	COSQD	CO	118
			58	GAUSS	GA	119
			59	CHIRP	CH	120
			60	NONVOC	NO	117
			61	VOICE	VO	115
			62	CVOICE	CV	116
			63	SPECT	SP	900
			64	RECTANGLE	RE	110
			65	PDM	PD	101
			66	NRZPCM	NR	102
			67	BPPCM	BP	103
			68	PPM	PP	104
			69	TELEG	TE	105
			70	PAMFM	PA	107
			71	AM	AM	301
			72	TPZD	TP	111
			73	ESPIKE	ES	108
			74	TRIANG	TR	112
			75	SAWTH	SA	113
			76	DMPSIN	SM	114
			77	VLTS	VL	2
			78	M461A	M4	1
			79	M6181D	M6	2
			80	M704A	M7	3
			81	SPEC	SP	900
			82	MILSPC	MI	1

TABLE 60 (CONCLUDED)

KEYWORD CODE	KEYWORD	ABBREVIATION	INDEX IN ALPHA ARRAY	ALPHA NUMERIC PARAMETERS	ABBREVIATION	ASSIGNED VALUE
16	ANTENNA	AN	83	DIPOLE	DI	1
			84	WHIP	WH	2
			85	SLOT	SL	3
			86	LOOP	LO	4
			87	PARDSH	PA	5
			88	LGPER	LG	6
			89	HORN	HO	7
			90	PSDAR	PS	8
			91	SPIRAL	SP	9
			*	NOW	NO	
			*	BOTTOM	BO	2
			*	TOP	TO	3
			*	FWDEDG	FW	4
			*	AFTEDG	AF	5
			*	TIP	TI	6
			92	HZTL	HZ	1
			93	VERTICAL	VE	2
			94	CIRCULAR	CI	3
17	BUNDLE	BU				
18	BSEG	BS				
19	WIRE	WI				
20	EFQ	EF				
21	WRTBL	WR	95	SHLD	SH	1
			96	UNSHLD	UN	2
			97	DSHLD	DS	3
22	EODATA	EO				
23	BPTS	BP				
24	FREQ	FR				
25	FQTBL	FQ				
26	EXEC	EX	98	CEAR	CE	3
			99	NEW	NE	0
			100	MOD	MO	1
			101	OLD	OL	2
			102	ISF	IS	1
			103	TRADEOFF	TO	1
			104	WAIVER	WA	2
			105	SGR	SG	2
			106	SURVEY	SU	3
27	OE	OE				
28	IE	IE				
29	WA	WA				
30	ETOD	ET				

* See aperture

5.2.2 IDIPR Common Blocks

This section contains tables of all labeled common blocks that are used in IDIPR, with the program mnemonic and definition of each variable contained in each common. The common blocks serve as the main means of data communication between the routines of IDIPR. A list of the common tables is given below.

TABLE NO.	COMMON BLOCKS
61	ALPS
62	BUN
63	CEARV
64	CHAR
65	DUPE
66	ERR
67	FFDTA
68	FLAG
69	FSDTA
70	INDX
71	IOUNIT
72	IOUWK
73	ISF
74	KEYS
75	KEYWD
76	MEUG
77	MOD
78	MSGERR
79	NKCP
80	NLINE
81	PID
82	RCDI
83	SPECT
84	SPIRO
85	STIX
86	SYS2
87	TITLE
88	XYZ

TABLE 61

COMMON BLOCK ALPS

PROGRAM NAME	DEFINITION
L1, L2, . . .	LIST OF ALL ALPHA CODE WORDS AND THEIR ASSIGNED VALUES SEE TABLE 60

TABLE 62

COMMON BLOCK BUN

PROGRAM NAME	DEFINITION
IPNT1(I)	"LEFT" BUNDLE POINT INDEX OF I^{th} BUNDLE SEGMENT
IPNT2(I)	"RIGHT" BUNDLE POINT INDEX OF I^{th} BUNDLE SEGMENT
IP(I,J)	TABLE OF BUNDLE POINTS THROUGH WHICH I^{th} WIRE PASSES
NWP(I)	NUMBER OF BUNDLE POINTS THROUGH WHICH I^{th} WIRE PASSES
WIRL(I)	LENGTH OF I^{th} WIRE
IS1(I,J)	LEFT GROUND CODE OF JTH SEGMENT, I^{th} WIRE
IS2(I,J)	RIGHT GROUND CODE OF JTH SEGMENT, I^{th} WIRE
IEND1(I,J,K)	PACKED LIST OF PORT CONNECTIONS ON EACH SIDE OF J^{th} SEGMENT, I^{th} WIRE
NFLAG(I,J)	NUMBER OF END POINTS OF JTH SEGMENT, I^{th} WIRE
SEGLTH(I)	LENGTH OF I^{th} BUNDLE SEGMENT
NBSEG	NUMBER OF BUNDLE SEGMENTS
NPTS	NUMBER OF BUNDLE POINTS
NWIRES	NUMBER OF WIRES
AVGSEP	AVERAGE SEPARATION BETWEEN TWO WIRES
IDAP(I)	APERTURE ID OF I^{th} BUNDLE SEGMENT
IWID(I)	WIRE ID OF I^{th} WIRE
IWTYPE(I)	WIRE TYPE ID OF I^{th} WIRE
NPORT(I,J)	INDEX OF PORT CONNECTED TO I^{th} WIRE AT J^{th} BUNDLE POINT

TABLE 63

COMMON BLOCK CEARV

PROGRAM NAME	DEFINITION
FWA	FLOATING POINT ARRAY FOR WAIVER DATA (SEE TABLE 41)
IBASE	CONTROL VARIABLE FOR CEAR TRADE-OFF RUN (0 IF NEW BASELINE IS TO BE GENERATED; 2 IF OLD BASELINE EXISTS)
ICHG	CODE WORD THAT TELLS TYPE OF CHANGE MADE TO PORT DATA (SEE TABLE 57)
IETOD	CONTROL VARIABLE FOR END-OF-DATA FOR CEAR TRADE-OFF RUN
IWA	INTEGER ARRAY FOR WAIVER ANALYSIS DATA (SEE TABLE 41)
NTOC	COUNTER OF TRADE-OFF ANALYSIS CASES
NWA	NUMBER OF WAIVER ANALYSIS CARDS

TABLE 64

	COMMON BLOCK CHAR
PROGRAM NAME	DEFINITION
IABC	ARRAY OF ALPHABETIC LETTERS
IDIG	ARRAY OF DIGITS
ISPEC	ARRAY OF EBIDIC SPECIAL CHARACTERS

TABLE 65

COMMON BLOCK DUPE

PROGRAM NAME	DEFINITION
ICALL	FLAG INDICATING WHAT TYPE OF DATA IS BEING TESTED FOR DUPLICATION: 1 APERTURE 2 ANTENNA 3 FILTER 4 WIRE CHARACTERISTIC TABLE 5 BUNDLE 6 BUNDLE POINT 7 PORT
NOMEN	ARRAY CONTAINING NOMENCLATURE MATCHING ICALL

TABLE 66

COMMON BLOCK ERR

PROGRAM NAME	DEFINITION
IERR	ERROR INDEX (SEE LIST OF ERRORS IN TABLE 160)
NERR	COUNT OF ERRORS DURING A RUN

TABLE 67

COMMON BLOCK FFDTA

PROGRAM NAME	DEFINITION
DATA/IATA	ARRAY CONTAINING ALL INPUT FOR 1 KEYWORD, A SUPERCARD OF UP TO 5 CARDS
ID	INDEX OR CARD COLUMN OF END OF KEYWORD IN SUPERCARD
IDD	ARRAY OF LETTERS FORMING AN ID AS DECODED FROM NUMERIC INPUT
IIDARY	ARRAY OF ALPHA ID'S DECODED FROM NUMERIC VALVES IN IPVARY
IPV	NUMERIC CODE WORD ASSOCIATED WITH ALPHA ID, IID
IPVARY	NUMERIC VALUES ASSOCIATED WITH ALPHA ID'S IN IIDARY
K1	INDEX OF FIRST LETTER IN SUPERCARD ARRAY OF AN ALPHA ID THAT IS TO BE CODED
K2	INDEX OF LAST LETTER IN SUPERCARD ARRAY OF AN ALPHA ID THAT IS TO BE CODED
NARY	AN ALPHA ID THAT IS TO BE CODED NUMBER OF ENTRIES IN IPVARY

TABLE 68

COMMON BLOCK FLAG

PROGRAM NAME	DEFINITION
IEXEC	CONTROL VARIABLE FOR TASK ON EXEC CARD = 1 ISP = 2 SGR = 3 CEAR
IRUN	CONTROL VARIABLE FOR CEAR SUB-TASK = 0 SGR = 1 TO = 2 WA = 3 SU (= 3 SPECIAL CASE IF EXECUTING AN ISP, OLD RUN AND INPUT FILE IS PIF AND NOT OLD ISF)
ISFLE	CONTROL VARIABLE FOR CREATING NEW ISF FILE = 0 DO NOT CREATE = 1 CREATE (DEFAULT)
ISFRN	CONTROL VARIABLE FOR LISTING OLD ISF FILE = 0 DO NOT LIST (DEFAULT) = 1 LIST
ISFRO	CONTROL VARIABLE FOR LISTING NEW ISF FILE = 0 DO NOT LIST = 1 LIST (DEFAULT)
KOD	CONTROL VARIABLE FOR KINDS OF DATA PRESENT FOR A RUN INDICES = 1, 2, 3 FOR SYSTEM, EQPT, BNDLE DATA RESPECTIVELY = 0 NOT PRESENT = 1 PRESENT

TABLE 69

COMMON BLOCK FSDTA

PROGRAM NAME	DEFINITION
IECFLG	SPARE
IPVAL	ARRAY OF NUMERIC VALUES ASSIGNED TO ALPHA CODES
ISFLG	ISF FILE MODIFICATION FLAG; 0-ADD, 1-MOD, 2-DEL
ISVAL	ARRAY OF INTEGER SUBPARAMETERS
JDEL17	BUNDLE DATA VALIDITY FLAG
NPARM	NUMBER OF PARAMETERS FOR A KEYWORD
NSPARM	ARRAY CONTAINING NUMBER IN EACH SUBPARAMETER GROUP
NSPGRP	NUMBER OF SUBPARAMETER GROUPS
PARAM	ARRAY OF FLOATING NUMBER PARAMETERS
SPARM	ARRAY OF FLOATING NUMBER SUBPARAMETERS

TABLE 70

COMMON BLOCK INDX

PROGRAM NAME	DEFINITION
IANT	ANTENNA INDEX
IAPR	APERTURE INDEX
IDEQ	EQUIPMENT ID
IDPRT	PORT ID
IDSS	SUBSYSTEM ID
IEQ	EQUIPMENT INDEX
IFTR	FILTER INDEX
IPRT	PORT INDEX
ISB	INDEX FOR SUBSYSTEM
IWB	INDEX FOR BUNDLE
IWIR	INDEX FOR WIRES
IWP	INDEX FOR SAVING WIRE PORT DATA
NANT	ANTENNA COUNTER
NAPR	APERTURE COUNTER
NEQ	EQUIPMENT COUNTER
NFTR	FILTER COUNTER
NPRT	PORTS PER EQPT COUNTER
NPRT	NUMBER OF PORTS COUNTER
NSB	NUMBER OF SUBSYSTEMS COUNTER
NWB	NUMBER OF BUNDLES COUNTER
NWCT	WIRE CHARACTERISITCS TABLE ENTRY COUNTER
NWIR	WIRE COUNTER

TABLE 71

COMMON BLOCK IOUNIT

PROGRAM NAME	DEFINITION
INN	LOGICAL INPUT UNIT ASSIGNMENT FOR CARD INPUT
IOU	LOGICAL OUTPUT UNIT ASSIGNMENT FOR SYSTEM OUTPUT
IT1	LOGICAL UNIT FOR PIF FILE
IT2	CONTROL FLAG FOR SUPPLEMENTAL PRINTOUT
IT3	LOGICAL UNIT FOR CARDIN FILE
IT4	LOGICAL UNIT FOR OLD ISF FILE
IT5	NOT USED
IT6	LOGICAL UNIT FOR NEW ISF FILE
JOBIS	CONTROL FLAG FOR JOB STATUS 0 - NEW JOB, CARD INPUT ONLY 1 - MODIFY JOB, CARD AND ISF FILE INPUT 2 - OLD JOB, ISF FILE INPUT ONLY EXCEPT FOR CONTROL CARDS

TABLE 72

COMMON BLOCK IOUWK

PROGRAM NAME	DEFINITION
IT10	LOGICAL UNIT ASSIGNMENT FOR SOURCE SPECTRA WORK FILE
IT11	LOGICAL UNIT ASSIGNMENT FOR RECEPTOR SPECTRA WORK FILE
IT12	LOGICAL UNIT ASSIGNMENT FOR SOURCE EQUIPMENT WORK FILE
IT13	LOGICAL UNIT ASSIGNMENT FOR RECEPTOR EQUIPMENT WORK FILE
IT14	LOGICAL UNIT ASSIGNMENT FOR BUNDLE WORK FILE

TABLE 73

COMMON BLOCK ISF

PROGRAM NAME	DEFINITION
APPRM2	APERTURE FLOATING POINT ARRAY (SEE TABLE 42)
APRM2	ANTENNA FLOATING POINT ARRAY (SEE TABLE 43)
BEP2	BUNDLE SEGMENT FLOATING POINT ARRAY (SEE TABLE 54)
BPTC2	BUNDLE NODE POINT FLOATING POINT ARRAY (SEE TABLE 53)
EPRM2	EQUIPMENT FLOATING POINT ARRAY (SEE TABLE 46)
FHI2	HIGHEST FREQUENCY TO BE CONSIDERED AS SPECIFIED BY USER
FLO2	LOWEST FREQUENCY TO BE CONSIDERED AS SPECIFIED BY USER
FPRM2	FILTER FLOATING POINT ARRAY (SEE TABLE 44)
FQTBL2	USER SUPPLIED FREQUENCY TABLE
FRQTBL	FREQUENCY TABLE GENERATED FROM USER INPUT AND USED FOR TASK ANALYSIS
IAPM2	ANTENNA INTEGER ARRAY (SEE TABLE 43)
IAPPM2	APERTURE INTEGER ARRAY (SEE TABLE 42)
IBEP2	BUNDLE SEGMENT INTEGER ARRAY (SEE TABLE 54)
IBPRM2	BUNDLE INTEGER ARRAY (SEE TABLE 52)
IBPT2	BUNDLE NODE POINT INTEGER ARRAY (SEE TABLE 53)
IEPRM2	EQUIPMENT INTEGER ARRAY (SEE TABLE 46)
IFLT2	FILTER INTEGER ARRAY (SEE TABLE 44)
IFMAX	MAXIMUM FREQUENCIES FOR 6 PORT TYPES FOR SOURCE AND RECEPTOR
IFMIN	MINIMUM FREQUENCIES FOR 6 PORT TYPES FOR SOURCE AND RECEPTOR
IPPRM2	PORT INTEGER ARRAY (SEE TABLE 47)
IPTCL	PACKED CODE CONTAINING POINT, WIRE AND BUNDLE INDEX ASSOCIATED WITH EVERY WIRE CONNECTED PORT, AND THE NUMBER OF GROUNDS (IPTCL IS EQUAL TO IPOINT + (100)* IWIRE + (10000)* IBUNDLE + (1000000)* NGROUNDS)

TABLE 73 (Concluded)

PROGRAM NAME	DEFINITION
IRO2	RECEPTOR INTEGER ARRAY (SEE TABLES 48-51)
ISO2	SOURCE INTEGER ARRAY (SEE TABLES 48-51)
IWB2	BUNDLE INDEX
IWCT2	WIRE CHARACTERISTIC TABLE INTEGER ARRAY (SEE TABLE 45)
IWPRM2	WIRE INTEGER ARRAY (SEE TABLE 55)
NFQMX	MAXIMUM NUMBER OF FREQUENCIES IN SPECTRUM SPECIFIED BY USER
NFQO2	NUMBER OF FREQUENCIES PER OCTAVE AS SPECIFIED BY USER
NFQU2	NUMBER OF USER SUPPLIED FREQUENCIES (UP TO 90)
NFRQ	NUMBER OF FREQUENCIES TO BE USED FOR THE EQUIPMENT AS OUTPUT BY FTGEN BASED ON USER INPUTS OR DEFAULTS
PPARM2	PORT FLOATING POINT ARRAY (SEE TABLE 47)
RPRM2	RECEPTOR FLOATING POINT ARRAY (SEE TABLES 48-51)
SRCE2	SOURCE FLOATING POINT ARRAY (SEE TABLES 48-51)
WCT2	WIRE CHARACTERISTICS TABLE FLOATING POINT ARRAY (SEE TABLE 45)

TABLE 74

COMMON BLOCK KEYS

PROGRAM NAME	DEFINITION
KEY1	KEYWORDS WHERE n IS THE VALUE ASSIGNED (SEE TABLE 59)

TABLE 75

COMMON BLOCK KEYWD

PROGRAM NAME	DEFINITION
KC	KC IS A NUMERIC CODE ASSIGNED TO THE KEYWORD OF THE INPUT CARD. THESE CODES ARE GIVEN IN TABLE 59

TABLE 76

COMMON BLOCK MBUG

PROGRAM NAME	DEFINITION
MBUG	FLAG THAT CAUSES IDIPR DEBUG PRINTOUT WHEN SET TO 1 IF IT IS ACTIVATED BY THE THIRD PARAMETER ON THE OUTPUT CARD SPECIFIED AS ISP, IDIPR SPECIAL PRINTOUT

TABLE 77

COMMON BLOCK MOD

PROGRAM NAME	DEFINITION
IDELnn	STORES THE ID OF ALL THE DELETED COMPONENTS (IN NUMERIC CODES) WHERE nn IS THE KC IDENTIFYING THE COMPONENT (SEE TABLE 59)
MODSPI	ARRAY OF MODIFY CODES FOR PORTS OF PIF FILE
MODSPM	ARRAY OF MODIFY CODES FOR PORTS AFTER MERGING OF ISF AND PIF
MODnn	MODIFY CODES WHERE nn IS KC. INITIALIZED AT -1. IT IS SET EQUAL TO 0, 1 OR -1, 2 FOR NEW, MOD OR DELETE, RESPECTIVELY. -1 FOR A HIERARCHY COMPONENT MEANS THE DATA OF THE COMPONENT IS NOT MODIFIED BUT A LOWER COMPONENT BELONGING TO IT IS MODIFIED. +1 MEANS MODIFY THE DATA ITSELF AND POSSIBLE LOWER MEMBERS BELONGING TO IT. (SEE TABLE 59 FOR nn VALUES
NDnn	COUNTER OF THE NUMBER OF DELETES FOR A KEYWORD, nn. (SEE TABLE 59 FOR VALUES OF nn.

TABLE 78

COMMON BLOCK MSGERR

PROGRAM NAME	DEFINITION
M1, M2 . . .	ERROR MESSAGE WHERE n IS EQUAL TO THE VALUE OF IERR (SEE TABLE 160, LIST OF ERROR MESSAGES)

TABLE 79

COMMON BLOCK NKCP

PROGRAM NAME	DEFINITION
NKCP	NUMBER OF PARAMETERS ASSOCIATED WITH A KEYWORD. IF NEGATIVE, IT IS THE MINIMUM NUMBER OF PARAMETERS FOR A KEYWORD WITH A VARIABLE NUMBER
NPSR	STARTING LOCATION IN ALPHA ARRAY OF SOURCE/RECEPTOR PARAMETERS BY SR CODE.

TABLE 80

COMMON BLOCK NLINE

PROGRAM NAME	DEFINITION
LINES	LINES PRINTED COUNTER

TABLE 81

COMMON BLOCK PID

PROGRAM NAME	DEFINITION
APARM	ANTENNA FLOATING POINT ARRAY (SEE TABLE 43)
APTARM	APERTURE FLOATING POINT ARRAY (SEE TABLE 42)
BEP	BUNDLE SEGMENT FLOATING POINT ARRAY (SEE TABLE 54)
BPTCO	BUNDLE NODE POINT FLOATING POINT ARRAY (SEE TABLE 53)
EFQ	ENVIRONMENTAL FIELD LEVEL FREQUENCIES
EI	INSIDE ENVIRONMENTAL FIELD LEVELS
EO	OUTSIDE ENVIRONMENTAL FIELD LEVELS
EPARM	EQUIPMENT FLOATING POINT ARRAY (SEE TABLE 46)
FPARM	FILTER FLOATING POINT ARRAY (SEE TABLE 44)
FQTBL	USER SUPPLIED FREQUENCY LIST
IAPM	ANTENNA INTEGER ARRAY (SEE TABLE 43)
IAPRM	APERTURE INTEGER ARRAY (SEE TABLE 42)
IBEP	BUNDLE SEGMENT INTEGER ARRAY (SEE TABLE 54)
IBPARM	BUNDLE INTEGER ARRAY (SEE TABLE 52)
IBPTS	BUNDLE NODE POINTS INTEGER ARRAY (SEE TABLE 53)
IEOI	ENVIRONMENTAL FIELD LEVEL FLAG
IEPARM	EQUIPMENT INTEGER ARRAY (SEE TABLE 46)
IFLT	FILTER INTEGER ARRAY (SEE TABLE 44)
IPPARM	PORT INTEGER ARRAY (SEE TABLE 47)
IRO	RECEPTOR INTEGER ARRAY (SEE TABLES 48-51)
ISO	SOURCE INTEGER ARRAY (SEE TABLES 48-51)
IWCT	WIRE CHARACTERISTICS TABLE INTEGER ARRAY (SEE TABLE 45)
IWPARM	WIRE INTEGER ARRAY (SEE TABLE 55)

TABLE 81 (Concluded)

PROGRAM NAME	DEFINITION
NEFQ	NUMBER FREQUENCIES FOR ENVIRONMENTAL FIELD LEVELS
NFQMAX	MAXIMUM NUMBER FREQUENCIES AS SPECIFIED BY THE USER
NFQO	NUMBER OF FREQUENCIES PER OCTAVE AS SPECIFIED BY USER
NFQU	NUMBER OF USER SUPPLIED FREQUENCIES
NPORT1	NUMBER OF PORTS AS READ IN ON PIF FILE
PPARM	PORT FLOATING POINT ARRAY (SEE TABLE 47)
RPARM	RECEPTOR FLOATING POINT ARRAY (SEE TABLES 48-51)
SRCE	SOURCE FLOATING POINT ARRAY (SEE TABLES 48-51)
WCT	WIRE CHARACTERISTICS TABLE FLOATING POINT ARRAY (SEE TABLE 45)

TABLE 82

COMMON BLOCK RCDI

PROGRAM NAME	DEFINITION
CAP	PORT CAPACITANCE, FARADS
DUCT	PORT INDUCTANCE, HENRYS
IBDUN	BUNDLE IDENTIFICATIONS (IN NUMERIC CODE)
RESIS	PORT TERMINATION RESISTANCE, OHMS

TABLE 83

COMMON BLOCK SPECT

PROGRAM NAME	DEFINTION
BWE	EFFECTIVE EMISSION BANDWIDTH
BWR	EFFECTIVE SUSCEPTIBILITY BANDWIDTH
IF1E	INDEX OF LOWEST FREQUENCY OF EMITTER
IF1R	INDEX OF LOWEST FREQUENCY OF RECEPTOR
IF2E	INDEX OF HIGHEST FREQUENCY OF EMITTER
IF2R	INDEX OF HIGHEST FREQUENCY OF RECEPTOR
SPE(I,J)	NARROWBAND EMISSION SPECTRUM FOR I=1, BROADBAND SPECTRUM FOR I=2
SPR(J)	NARROWBAND SUSCEPTIBILITY SPECTRUM
SPRLIM(J)	NARROWBAND SUSCEPTIBILITY SPECTRUM LIMIT
RFR1E	LOWER LIMIT OF EMITTER REQUIRED FREQUENCY RANGE
RFR1R	LOWER LIMIT OF RECEPTOR REQUIRED FREQUENCY RANGE
RFR2E	UPPER LIMIT OF EMITTER REQUIRED FREQUENCY RANGE
RFR2R	UPPER LIMIT OF RECEPTOR REQUIRED FREQUENCY RANGE

TABLE 84

COMMON BLOCK SPIRO

PROGRAM NAME	DEFINITION
BW	EFFECTIVE BANDWIDTH OF EMITTER OR RECEPTOR
FC	WORST CASE RF TUNED FREQUENCY
FREQ1	LOW END OF FREQUENCY INTERVAL
FREQ2	HIGH END OF FREQUENCY INTERVAL
GB	BROADBAND EMISSION LEVEL
GN	NARROWBAND EMISSION OR SUSCEPTIBILITY LEVEL
IERS	ERROR CODE
IS(J)	INPUT DATA ARRAY EQUAL TO ISO2(I,J) OR IRO2(I,J) IN ISF BLOCK (SEE TABLES 48-51)
S(J)	INPUT DATA ARRAY EQUAL TO SRCE2(I,J) OR RPRM2(I,J) IN ISF BLOCK (SEE TABLES 48-51)
ZDB	IMPEDANCE IN LOGARITHMIC UNITS

TABLE 85

COMMON BLOCK STIK

PROGRAM NAME	DEFINITION
ICAT	INITIALLY 0. USED DURING FILE MERGING. WHEN NEW EQUIPMENTS ARE ENCOUNTERED ON PIF, ICAT IS SET TO 1 AND THE NEW EQUIPMENTS ARE READ IN AS OLD ISF EQUIPMENT BY CHANGING UNITS. THIS IS DONE TO SKIP HAVING TO SWITCH ARRAYS. ICAT = 1 SAYS THE OLD ISF RECORDS BEING READ ARE REALLY NEW EQUIPMENTS FROM PIF (ALSO USED IN SAME FASHION DURING BUNDLE PROCESSING.
IDBNA	IDENTIFICATION OF BUNDLES ADDED. NOT CURRENTLY USED
IDBND	IDENTIFICATION OF BUNDLES DELETED
IDBNM	IDENTIFICATION OF BUNDLES MODIFIED. NOT USED
IDEQA	IDENTIFICATION OF EQUIPMENTS ADDED. NOT USED
IDEQD	IDENTIFICATION OF DELETED EQUIPMENT
IDEQM	IDENTIFICATION OF MODIFIED EQUIPMENT. NOT USED
IENDI	FLAG THAT SIGNALS WHEN THE END OF I.S.F. EQUIPMENTS BUNDLES REACHED
IEQ1	INDEX OF P.I.F. EQUIPMENT AS READ IN FROM P.I.F. FILE
IEQ2	INDEX OF ISF EQUIPMENT AS READ IN FROM I.S.F. FILE
NAMF	FLAG USED IN REPORT FOR HEADER; = 1 OLD ISF; = 2 NEWISF; = 3 PIF
NBA	NUMBER OF BUNDLES ADDED. NOT USED
NBD	NUMBER OF BUNDLES DELETED
NBM	NUMBER OF BUNDLES MODIFIED. NOT USED
NEA	NUMBER OF EQUIPMENTS ADDED. NOT USED
NED	NUMBER OF EQUIPMENTS DELETED
NEM	NUMBER OF EQUIPMENTS MODIFIED. NOT USED

TABLE 86

COMMON BLOCK SYS2

PROGRAM NAME	DEFINITION
EFQ2	ENVIRONMENTAL FIELD LEVEL FREQUENCIES
EI2	INSIDE ENVIRONMENTAL FIELD LEVELS
EO2	OUTSIDE ENVIRONMENTAL FIELD LEVELS
IEOI2	ENVIRONMENTAL FIELD LEVEL FLAG
IRMRK2	NUMBER OF CHARACTERS IN REMARK
ISYS2	SYSTEM TYPE CODE; 1 = AIRCRAFT, 2 = GROUND, 3 = SPACE
ITITL2	NUMBER OF CHARACTERS IN TITLE
MDL2	SYSTEM MODEL CODE (AIR AND SPACECRAFT ONLY) ROUND = 0, FLAT = 1
NANT2	NUMBER OF ANTENNAS
NAPR2	NUMBER OF APERTURE
NEFQ2	NUMBER OF ENVIRONMENTAL FIELD LEVELS
NFTR2	NUMBER OF FILTERS
NPORT2	NUMBER OF PORTS PER EQUIPMENT
NWCT2	NUMBER OF ENTRIES IN WIRE CHARACTERISTICS TABLE
RMRK2	REMARKS ARRAY
SYF2	FUSELAGE PARAMETERS (SEE TABLE 56)
SYG2	GROUND PARAMETERS (SEE TABLE 56)
SYS2	SYSTEM PARAMETERS (SEE TABLE 56)
SYW2	WING ROOT AND WINGTIP PARAMETER (SEE TABLE 56)
TITL2	TITLE ARRAY

TABLE 87

COMMON BLOCK TITLE

PROGRAM NAME	DEFINITION
IRMRK	COUNTER OF NUMBER OF CHARACTERS IN REMARKS ARRAY
ITITL	COUNTER OF NUMBER OF CHARACTERS IN TITLE ARRAY
KWPREV	STORES PREVIOUS KEYWORD IF IT IS AN EQPT OR BUNDLE
RMRK	ARRAY CONTAINING REMARKS
TITLE	ARRAY OF CHARACTERS FROM TITLE CARD

TABLE 88

COMMON BLOCK XYZ

PROGRAM NAME	DEFINITION
ALT	ALTITUDE (FEET) FOR GROUND STATION ONLY
ASM	ADJUSTMENT SAFETY MARGIN
DUMDUM	DUMMY
EMPL	EMI MARGIN PRINT LIMIT
EPSR	RELATIVE PERMITTIVITY
FHI	HIGHEST FREQUENCY TO BE USED AT USER REQUEST
FLO	LOWEST FREQUENCY TO BE USED AT USER REQUEST
RSN	CONICAL NOSE LIMIT (INCH)
ISYSTP	SYSTEM TYPE CODE; 1=AIR, 2=GROUND, 3=SPACE
MDL	MODEL CODE; 0=ROUND, 1=FLAT
RADIUS	NOT USED
RHOC	CORE RADIUS
RHOF	FUSELAGE RADIUS
SIGMA	CONDUCTIVITY (GROUND STATION)
SLAT	LATITUDE
SLON	LONGITUDE
THETA	NOT USED
WLBOT	WATER LINE OF BOTTOM
WLC	WATER LINE OF CENTROID
WRAFS	FUSELAGE STATION OF AFT EDGE OF WING ROOT
WRBL	BUTT LINE OF WING ROOT
WRFFS	FUSELAGE STATION OF FORWARD EDGE OF WING ROOT
WRWL	WATER LINE OF WING ROOT

TABLE 88 (Concluded)

PROGRAM NAME	DEFINITION
WTAFS	FUSELAGE STATION OF AFT EDGE OF WING TIP
WTBL	BUTT LINE OF WING TIP
WTFFS	FUSELAGE STATION OF FORWARD EDGE OF WING TIP
WTWL	WATER LINE OF WING TIP

5.3 TART SUBROUTINES

This section describes all the subroutines that make up the Task Analysis Routine. The descriptions include calling arguments, common blocks used and defintiions of all internal variables.

The subroutines are grouped into four functional blocks: Task Routines, Analysis and Spectrum Adjust Routines, Coupling Routines, and Wrapup Routines. A hierarchy diagram indicating the levels and calling relationships is given in Figure 5.

I. Task Routines

1. TART
2. CEAR
3. SGR

II. Analysis and Spectrum Adjust Routines

4. RCPTRD	11. TEMPNT
5. EMTRD	12. HEADER
6. EMCASA	13. WASSR
7. BWFCTR	14. SLINT
8. TORS	15. FQTINT
9. EMINTS	16. PAREAD
10. PEMPNT	17. SYSDR

III. Coupling Routines

18. COUPLE
    19. ACTFER (antenna coupled routines)

20. AIRCFT	25. GNDPRP
21. WINGSH	26. FTW
22. CYLMDL	27. DCYL
23. VEHSET	28. DSL
24. GAIN	29. CSH

    30. WTWTFR (wire-to-wire routines)

31. SHFAC	39. CMPLXO
32. DCRES	40. CMPLX1
33. ACOSH	41. CMPLX2
34. CUPIND	42. CMPLX3
35. WSIND	43. CUPDUC
36. SHRES	44. CAPEND
37. WSCAP	45. IWTP
38. CUPCAP	46. NTYP

    47. CTCTFR (case-to-case routine)
    48. FILTER (filter routine)
    49. ENVIRN (environmental field routine)
    50. INTERP
    51. SIDE
    52. LOAD

IV. Wrapup Routines

53. WRAPUP
54. WFREAD
55. ASPNT
56. ALPH
57. ISFRIT
58. FTSRCH

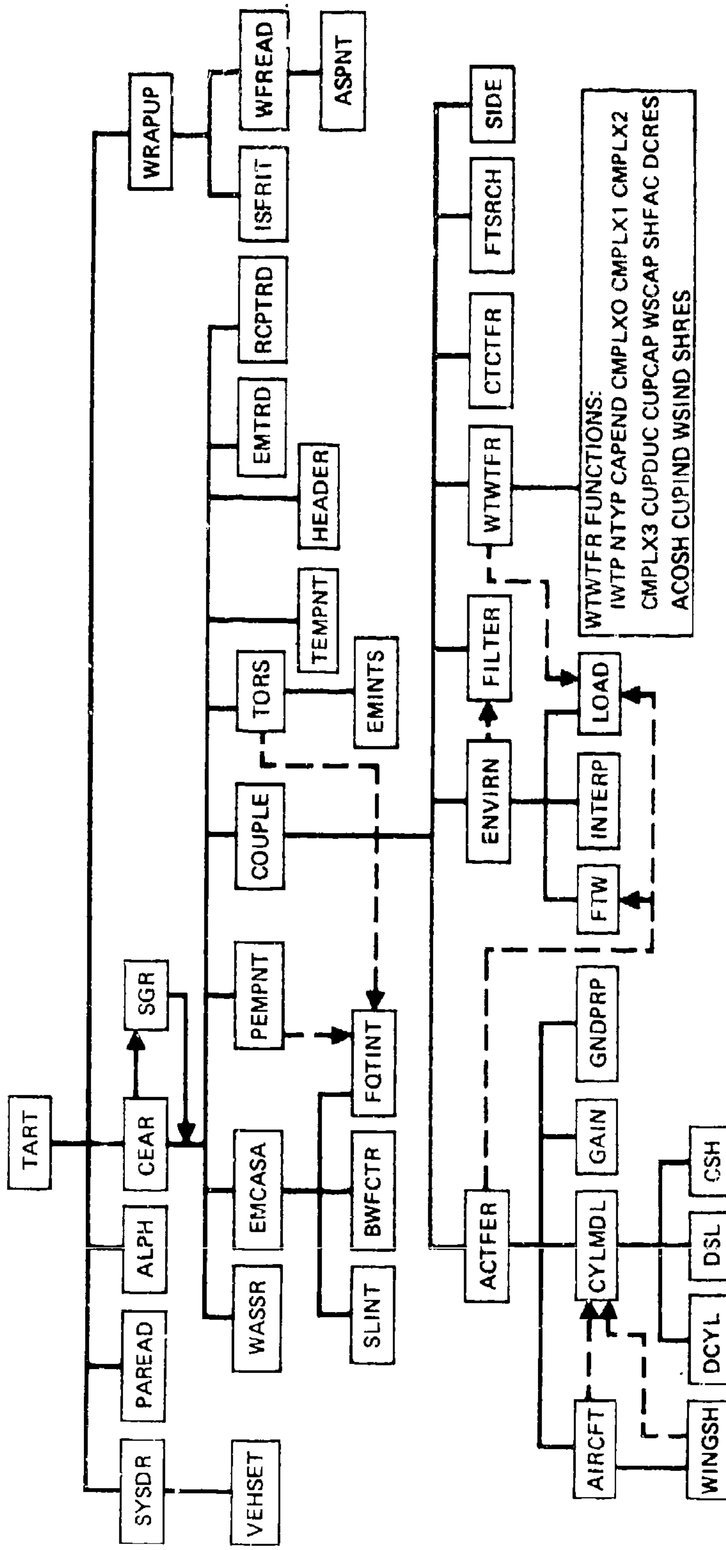

FIGURE 5
TART SUBROUTINE HIERARCHY

GP74 0267 3

5.3.1 Name: TART

DESCRIPTION

TART is the main program for the Task Analysis Section of IEMCAP. It calls all subroutines and directs the overall job flow.

DATA REQUIREMENTS

ARGUMENTS: none

COMMON BLOCKS:

IOUNIT, IOUWK, IOUSCF, FLAG, ERR, PRTWRK, ISFE, ISFR, ATAWRK, TITLE, SYS2, XYZ, ISF, CEARV, RCDI, INDX

TABLE 89

TART VARIABLES

PROGRAM NAME	DEFINITION
I	GENERAL INDEX
IC	GENERAL INDEX
ICHCD	HOLDING VARIABLE FOR ICHG
IDCD	DECODED ID'S
IRUN1	IRUN + 1
ISYS	ARRAY CONTAINING SYSTEM TYPE NAMES FOR OUTPUT
J	GENERAL INDEX
NP	NO. OF PORTS
TAD	ARRAY CONTAINING TASK ANALYSIS NAMES FOR OUTPUT

5.3.2 Name: CEAR

DESCRIPTION

The Comparative EMI Analysis Routine (CEAR) is the main driver for all analysis tasks except EMC specification generation. It controls the working file read routines (EMTRD and RCPTRD), the transfer function model routines (via COUPLE), EMI margin routines, and the Baseline Transfer File (BTF) to perform EMC survey, trade-off, and specification waiver analyses. It also provides a link from the executive to the Specification Generation Routine (SGR) for use in overlaying the program.

CEAR is divided into two basic sections. The first is for analyses using the transfer function routines; and the second, for analyses which do not use the transfer function routines. The first section is used for the EMC survey and trade-off baseline system analyses as well as the generation of the BTF. This section is also used for trade-off comparative analyses of the modified system when the modifications require use of the transfer models, such as changes in antenna locations, wire routing, and box locations or if new ports have been added. The second section of CEAR is used for specification waiver analysis and for trade-off comparative analyses when changes are to spectra only.

DATA REQUIREMENTS

ARGUMENTS: none

COMMON BLOCKS:

IOUNIT, IOUWK, IOUSCF, FLAG, ERR, PRTWRK, ISFE, ISFR, TITLE, SYS2, XYZ,

CEARV, ISF, EMCASC, EMBSLN

TABLE 90

CEAR VARIABLES

PROGRAM NAME	DEFINITION
ANYL	ARRAY CONTAINING LABELS USED FOR CEAR TITLE PAGE
EM	EMI MARGIN (dB)
EMMXB	BASELINE MAXIMUM EMI MARGIN (dB)
FMATCH	LOGICAL VARIABLE = TRUE IF MATCH EXISTS BETWEEN BTF AND WORKING FILES FOR EMTR PORT
I	GENERAL INDEX

TABLE 90 (Continued)

PROGRAM NAME	DEFINITION
IANYL	ANALYSIS INDEX
	IANYL = 1 BASELINE SYSTEM OR SURVEY
	= 2 MODIFIED SYSTEM WITH PATH CHANGES
	= 3 MODIFIED SYSTEM WITH SPECTRA CHANGES ONLY
	= 4 SPECIFICATION WAIVER ANALYSIS
IB	BANDWIDTH INDEX (1 = NB, 2 = BB)
ICH	VALUE OF ICHG FOR SPECIFIC PORT
ICHCV	CONVERSION ARRAY BETWEEN GENERAL PORT CHANGE CODE AND CEAR CHANGE CATEGORY CODE
ICHGE1	HOLDING VARIABLE FOR ICHGE
IEQEF	EMTR EQPT INDEX FROM BTF
IEQEP	EMTR EQPT INDEX OF PREVIOUSLY READ PORT FROM BTF
IEQES	EMTR EQPT INDEX FROM EMTR SPECT FILE (UESF)
IEQRP	RCPT EQPT INDEX OF PREVIOUSLY READ PORT FROM BTF
IEQRS	RCPT EQPT INDEX FROM RCPT SPECTRUM FILE (URSF)
IFRQ	FREQUENCY INDEX
INCALL	INCALL = 0 FIRST CALL TO CEAR, OTHERWISE = 1
INP	CALLING ARG TO WASSR FOR NEW PAGE
IPATHM	PATH CODE OF MODIFIED PORT PAIR
IPRNT	PRINT INDEX FOR PEMPNT AND TEMPNT ARGS
IPRTEF	EMTR PORT INDEX FROM BTF
IPRTES	EMTR PORT INDEX FROM UESF
IPRTRP	RCPT PORT INDEX PREVIOUSLY READ FROM BTF
IPRTRS	RCPT PORT INDEX FROM URSF
J	GENERAL INDEX

TABLE 90 (Concluded)

PROGRAM NAME	DEFINITION
LADPRT	LOGICAL = TRUE IF EITHER PORT IN MODIFIED SYST HAS BEEN ADDED
LBASLN	LOGICAL = TRUE IF BASELINE SYSTEM OR SURVEY
LEBCE	LOGICAL = TRUE IF END OF BASELINE COUPLED EMTRS TO SELECTED RCPTR HAS BEEN READ ON BTF
LNBCE	LOGICAL = TRUE IF NO BASELINE COUPLED EMTRS TO SELECTED RCPT ARE FOUND ON BTF
NMCE	NO. OF EMTRS IN MOD SYSTEM COUPLED TO SELECTED RCPT
NSP	LOGICAL = TRUE FOR NO SUPPLEMENTAL PRINTOUT
PSP	LOGICAL = TRUE FOR SUPPLEMENTAL PRINTOUT
RSIG	RECEIVED SIGNAL AT RCPT (dB)
RSIGEF	RECEIVED SIGNAL FROM ENVIRONMENTAL FIELD
RSIGM	MAX RECEIVED SIGNAL IN RCPT FREQ INTERVALS
RSIGT1	HOLDING VARIABLE FOR RSIGT(IFRQ)

5.3.3 Name: SGR

DESCRIPTION

The Specification Generation Routine (SGR) is the main driver for generating EMC emission and susceptibility specification limits. It is at the same heirachical level in the program as CEAR in that it directs the working file read reoutines, the transfer function model routines, and the EMI margin routines for specification generation. It also generates a Baseline Transfer File (BTF) for use by CEAR.

The routine first selects a receptor port and cycles through the emitters. When an emitter is encountered with a coupling path to the selected receptor, the transfer ratio is computed (via COUPLE). EMCASA is then called to compute the received signal and to adjust the nonrequired portions of the emitter spectra causing interference to a compatible level or to the user-specified adjustment limit. When all emitters have been examined and adjusted relative to the selected receptor, the next receptor is selected, and the process is repeated.

When all emitters have been adjusted with respect to all receptors, the first receptor is again selected. The total received signal from all emitters coupled to it is computed using the final emitter spectra. This total signal includes the effects of the environmental field, if present. The EMI margins are computed to the total signal, and where EMI is present, the receptor susceptibility is adjusted to a compatible level or to its limit. The routine then cycles through all the emitters coupled to the selected receptor, computing the EMI margins between adjusted emitter and adjusted receptor spectra. The transfer and EMI margin data are written onto the BTF, and if the maximum margin exceeds the user-specified print limit, the case is printed as unresolved interference. The next receptor is then selected, and the process is repeated until all receptors have been adjusted and analyzed.

DATA REQUIREMENTS

ARGUMENTS: None

COMMON BLOCKS:

IOUNIT, IOUWK, IOUSCF, ERR, PRTWRK, ISFE, ISFR, ATAWRK, TITLE, SYS2, XYZ, ISF, EMCASC

TABLE 91

SGR VARIABLES

PROGRAM NAME	SYMBOL	DEFINITION
ADJ1	A	ADJUSTMENT AMOUNT (dB)
BLANK		BLANK CHARACTER
EM	M	EMI MARGIN (dB)
EMADJ		LOGICAL = TRUE IF SUPPLEMENTAL PRINTOUT REQUESTED
FQRL		LOWER INTERVAL BOUNDARY FREQUENCY FOR SELECTED TABLE FREQ
FQRU		UPPER INTERVAL BOUNDARY FREQUENCY FOR SELECTED TABLE FREQ
I		GENERAL INDEX
IB		GENERAL INDEX
ICE		COUPLED EMTR INDEX
IEQEF		EMTR EQPT INDEX FROM UNADJ EMTR SPECT FILE (UESF)
IEQEP		EMTR EQPT INDEX PREVIOUSLY READ FROM UESF
IEQEP1		EMTR EQPT INDEX PREVIOUSLY WRITTEN TO BTF
IEQRP		RCPT EQPT INDEX PREVIOUSLY READ FROM SCRATCH TRANSFER FILE (SCHTR)
IFRQ		FREQ INDEX
IPRTEF		RCPT PO[illegible] INDEX PREVIOUSLY READ FROM SCHTR
ISCRF		SCRATCH FILE LOGICAL UNIT INDEX
J		GENERAL INDEX
LINE		PRINTOUT LINE COUNTER
LP		MAX OUTPUT LINES PER PAGE

TABLE 91 (Concluded)

PROGRAM NAME	SYMBOL	DEFINITION
NCE		ARRAY CONTAINING NUMBER OF COUPLED EMTRS FOR EACH RCPT
REQD		CHARACTERS "REQD"
RFR		CHARACTER OUTPUT VARIABLE
RSIG	R	RECEIVED SIGNAL LEVEL (dB)
RSIGEF		RECEIVED SIGNAL FROM ENVIRONMENTAL FIELD
SLIMR		RCPT RATIO OF SPECTRUM TO ADJUST LIMIT dB
SPRT		MINIMUM OF RCPT SPECT LEVEL OR ADJUST LIMIT (dB)
SUSP		LOGICAL = TRUE IF UNADJUSTED SPECTRUM OUTPUT NOT DESIRED

5.3.4 Name: RCPTRD

DESCRIPTION

RCPTRD reads the receptor equipment and spectrum working files for CEAR and SGR. Upon entry, the spectrum is read for the selected receptor from the Unadjusted Receptor Spectrum File. If the selected receptor equipment is different from the previous pass, the equipment data arrays are read from the Receptor Equipment Data File. The parameters for the selected port are then extracted from the equipment data arrays. If, on the previous pass, the last receptor port had been read, the equipment index is set to zero; and all receptor working files are rewound.

DATA REQUIREMENTS

ARGUMENTS: none

COMMON BLOCKS:

IOUNIT, IOUWK, IOUSCF, FLAG, ERR, PRTWRK, ISFE, ISFR, CEARV, ISF

TABLE 92

RCPTRD VARIABLES

PROGRAM NAME	DEFINITION
I	GENERAL INDEX
ICHCV	CONVERSION ARRAY BETWEEN GENERAL PORT CHANGE CODE (ICHG) AND CEAR CHANGE CATEGORY CODE
IEND	INDEX OF END OF RPRM ARRAY
IEP	EQPT PRINTOUT INDEX (=0 FOR NO OUTPUT)
IEQRF	PREVIOUSLY READ RECEPTOR EQPT INDEX
IP	GENERAL INDEX
ISR	SOURCE/RECEPTOR CODE (SEE IRO2)
K	GENERAL INDEX
NFRQR	NO. OF FREQS IN RCPT FREQ TABLE
NSP	NO. OF SUBPARAMETERS FOR COMPUTATION OF IEND

5.3.5 Name: EMTRD

DESCRIPTION

EMTRD reads the emitter equipment and spectrum working files for CEAR and SGR. Upon entry, the next emitter port is selected, and its spectra are read from the Unadjusted Emitter Spectrum File (UESF). If the equipment of the selected emitter port is different from that of the previous pass through EMTRD, the parameter arrays are read from the Emitter Equipment Data File. At this point, a test is made to see if the emitter and receptor ports currently selected are in the same equipment and hence presumed compatible. If they are in different equipments, the working parameters for the selected emitter are placed in common and the routine returns to the calling routine. If they are in the same equipment, the next emitter is selected, and the process repeated. If, on the previous pass, the data for the last emitter port had been read, the emitter equipment index is set to zero to flag this. All emitter working files are then rewound. If the routine was called by SGR, the file logical unit indices of the emitter adjusted and unadjusted spectrum files are swapped.

DATA REQUIREMENTS

ARGUMENTS: none

COMMON BLOCKS:

IOUNIT, IOUWK, IOUSCF, FLAG, ERR, PRTWRK, ISFR, CEARV, ISF

TABLE 93

EMTRD VARIABLES

PROGRAM NAME	DEFINITION
I	GENERAL INDEX
ICHCV	CONVERSION ARRAY BETWEEN GENERAL PORT CHANGE CODE (ICHG) AND CEAR CHANGE CATEGORY CODE
IEND	INDEX OF END OF SRCE ARRAY (LESS HARMONICS)
IEND2	INDEX OF END OF SRCE ARRAY INCLUDING HARMONICS
IEQEF	EMTR EQPT INDEX FROM PREVIOUS PASS
IP	GENERAL INDEX
IS	INDEX OF START OF HARMONICS IN SRCE
J	GENERAL INDEX
NR	NO. OF HARMONICS
NSP	NO. OF SUBPARAMETERS
NSP1	NO. OF SUBPARAMETERS

5.3.6 Name: EMCASA

DESCRIPTION

EMCASA, the Emitter Margin Calculation and Spectrum Adjustment Routine, is called by SGR and CEAR. It computes the received signal and EMI margins between an emitter-receptor port pair at all frequencies common to the two ports. The routine also performs the emitter spectrum adjustment for SGR. See the detailed flowcharts for further details of routine operation.

DATA REQUIREMENTS

ARGUMENTS:

IADJ - adjustment index

= 1 compute EMI margins and adjust emitter spectra

= 2 compute margins only

COMMON BLOCKS:

IOUNIT, IOUWK, IOUSCF, ERR, PRTWRK, ISFE, ISFR, CEARV, ISF, XYZ, EMCASC

TABLE 94

EMCASA VARIABLES

PROGRAM NAME	SYMBOL	DEFINITION
ADJ		ADJUSTMENT AMOUNT (dB)
ADJB	A_B	ADJUSTMENT AMOUNT - BROAD BAND (BB)
ADJN	A_N	ADJUSTMENT AMOUNT - NARROW BAND (NB)
BWFBS	$B(f_{rB})$	BANDWIDTH FACTOR AT f_{rB} (dB)
BWFS	$B(f_{es})$	BANDWIDTH FACTOR AT f_{es} (dB)
DBS		TEMPORARY HOLDING VARIABLE
DPB		TEMPORARY HOLDING VARIABLE
EMB	M_{SB}	EMI MARGIN - BB
EMN	M_{SN}	EMI MARGIN - NB
FQEP	f_{ep}	PREVIOUS EMTR SEARCH FREQ

TABLE 94 (Continued)

PROGRAM NAME	SYMBOL	DEFINITION
FQEPDB		f_{ep} IN dB
FQEPL		LOWER INTERVAL BOUNDARY FREQ OF f_{ep}
FQEPU		UPPER INTERVAL BOUNDARY FREQ OF f_{ep}
FQES	f_{es}	EMTR SEARCH FREQ
FQESDB		f_{es} IN dB
FQESL		LOWER INTERVAL BOUNDARY FREQ OF f_{es}
FQESU		UPPER INTERVAL BOUNDARY FREQ OF f_{es}
FQRBL		LOWER INTERVAL BOUNDARY FREQ OF f_{rB}
FQRBS	f_{rB}	RCPT BACK-SEARCH FREQ
FQRBSD		f_{rB} IN dB
FQRBU		UPPER INTERVAL BOUNDARY FREQ OF f_{rB}
FQRP	f_{rp}	PREVIOUS RCPT SEARCH FREQ
FQRPDB		f_{rp} IN dB
FQRS	f_{rs}	RCPT SEARCH FREQ
FQRSDB		f_{rs} IN dB
FQRTRM		HIGHEST COMMON RCPT TABLE FREQ
I		GENERAL INDEX
IBND		BAND INDEX: 1 = NB, 2 = BB
IFQEP		INDEX OF f_{ep} IN EMTR FREQ TABLE
IFQES		INDEX OF f_{es}
IFQRBS		INDEX OF f_{rB} IN RCPT FREQ TABLE
IFQRP		INDEX OF f_{rp}
IFQRS		INDEX OF f_{rs}
LIADJ		LOGICAL = TRUE IF EMTR SPECTRUM ADJUST REQUIRED

TABLE 94 (Continued)

PROGRAM NAME	SYMBOL	DEFINITION
LRFRP		LOGICAL = TRUE IF f_{ep} IN EMTR REQD FREQ RANGE
LRFRS		LOGICAL = TRUE IF f_{es} IN EMTR REQD FREQ RANGE
RSENS	S_B	RECEPTOR SENSITIVITY AT f_{rB}
RSIGB	R_N	RECEIVED SIGNAL - NB
RSIGN	R_B	RECEIVED SIGNAL - BB
SPEBS	P_B	EMTR SPECTRUM LEVEL AT f_{rB} UNDER ANALYSIS
SPEBSB	P_{BN}	EMTR SPECTRUM LEVEL AT f_{rB} - BB
SPEBSN	P_{BB}	EMTR SPECTRUM LEVEL AT f_{rB} - NB
SPELP	L_p	EMTR SPECT ADJUST LIMIT AT f_{ep} UNDER ANALYSIS
SPELPB	L_{pB}	EMTR SPECT ADJUST LIMIT AT f_{ep} - BB
SPELPN	L_{pN}	EMTR SPECT ADJUST LIMIT AT f_{ep} - NB
SPELS	L_s	EMTR SPECT ADJUST LIMIT AT f_{es} UNDER ANALYSIS
SPELSB	L_{sB}	EMTR SPECT ADJUST LIMIT AT f_{es} - BB
SPELSN	L_{sN}	EMTR SPECT ADJUST LIMIT AT f_{es} - NB
SPEP	P_p	EMTR SPECT LEVEL AT f_{ep} UNDER ANALYSIS
SPEPB	P_{pB}	EMTR SPECT LEVEL AT f_{ep} - BB
SPEPN	P_{pN}	EMTR SPECT LEVEL AT f_{ep} - NB
SPEPT	P_p'	TEST VALUE OF P_p
SPES	P_s	EMTR SPECT LEVEL AT f_{es} UNDER ANALYSIS
SPESB	P_{sB}	EMTR SPECT LEVEL AT f_{es} - BB
SPESN	P_{sN}	EMTR SPECT LEVEL AT f_{es} - NB
SPEST	P_s'	TEST VALUE OF P_s

TABLE 94 (Concluded)

PROGRAM NAME	SYMBOL	DEFINITION
SPETST	P_r	ROTATION TEST LEVEL
SPRP	S_p	RCPT SUSC LEVEL AT f_{rp}
SPRS	S_s	RCPT SUSC LEVEL AT f_{rs}
TRFS	$T(f_{es})$	TRANSFER RATIO AT f_{es}

5.3.7 <u>Name: BWFCTR</u>

DESCRIPTION

This subroutine computes the bandwidth factor in dB for broadband signals. This factor represents the maximum power of the signal entering the receptor passband at the frequency of interest. In the receptor required frequency range, the channel bandwidth of the receptor is used. Outside this range, a standard bandwidth representing the minimum test instrument bandwidth is used.

DATA REQUIREMENTS

ARGUMENTS: none

COMMON BLOCKS:

PRTWRK

TABLE 95

BWFCTR VARIABLES

PROGRAM	DEFINITION
LRFRE	LOGICAL = TRUE IF IN EMTR REQD FREQ RANGE
LRFRR	LOGICAL = TRUE IF IN RCPT REQD FREQ RANGE

5.3.8 Name: TORS

DESCRIPTION

TORS computes the total received signal into the receptors from all emitters, and it computes the integrated EMI margin. It is called by CEAR and SGR after EMI margins have been computed for a port pair. A receptor frequency table is selected, and its boundary interval frequencies are determined. The received signal arrays, computed in EMCASA, are scanned at each emitter frequency within the interval including the received signal at the selected receptor frequency. The maximum of these is determined, converted to normalized power, and added to the total signal array. This process is repeated for all receptor frequencies common to the emitter frequency range.

During this scanning, EMINTS is called to compute the integrated EMI margin between the frequencies being scanned. The broadband and narrowband components are added together and summed over the frequency range common to the two ports.

DATA REQUIREMENTS

ARGUMENTS:

ICALL = 1 compute EMI margins at rcpt freqs

= 2 use stored EMI margins at rcpt freqs

COMMON BLOCKS:

IOUNIT, PRTWRK, EMCASC, ISFE, ISFR

TABLE 96

TOR[illegible] VARIABLES

PROGRAM NAME	SYMBOL	DEFINITION
BWFE		BANDWIDTH FACTOR OF EMTR
BWFR		BANDWIDTH FACTOR OF RCPT
EINTB		INTEGRATED MARGIN BROAD BAND COMPONENT (RATIO)
EINTN		INTEGRATED MARGIN NARROW BAND COMPONENT (RATIO)
EMBE		BB EMI MARGIN AT f_{es}
EMBR		BB EMI MARGIN AT f_{rs}
EMINPD		EMINP IN dB
EMNE		NB EMI MARGIN AT f_{es}
EMNR		NB EMI MARGIN AT f_{rs}
FQEP	f_{ep}	PREVIOUS EMTR SEARCH FREQ
FQEPDB		f_{ep} IN dB
FQES	f_{es}	EMTR SEARCH FREQ
FQESDB		f_{es} IN dB
FQPL		LOWER INTERVAL BOUNDARY OF f_{rs}
FQRS	f_{rs}	RCPT SEARCH FREQ
FQ[illegible]		HIGHEST COMMON RCPT FREQ UPPER BOUNDARY FREQ

TABLE 96 (Concluded)

PROGRAM NAME	SYMBOL	DEFINITION
FQRU		UPPER INTERVAL BOUNDARY OF f_{rs}
FQTRMC		HIGHEST COMMON RCPT FREQ FROM TABLE
F1		LOWER INTEGRATING FREQ. USED TO INITIALIZE INTEGRAL
IFQES		INDEX OF f_{es}
IFQRS		INDEX OF f_{rs}
IGT		CONTROL INDEX
LCALL		LOGICAL = TRUE IF ICALL = 2
NSP		LOGICAL = TRUE FOR PRINTOUT OF SUMMATION
RSG		SUM OF BROADBAND AND NARROWBAND SIGNALS (NORMALIZED POWER)
RSGBMX		MAXIMUM VALUE BB RCVD SIG IN FREQ INTERVAL
RSGDB		RSG IN dB
RSGNMX		MAXIMUM VALUE NB RCVD SIG IN FREQ INTERVAL
RSGSB		BB RECEIVED SIGNAL AT f_{rs}
RSGSN		NB RECEIVED SIGNAL AT f_{rs}
RSIGB		BB RECEIVED SIGNAL AT f_{es}
RSIGM		MAX RECEIVED SIGNAL IN INTERVAL (ARRAY)
RSIGN		NB RECEIVED SIGNAL AT f_{es}
SPEB		BB EMTR SPECTRUM LEVEL
SPEN		NB EMTR SPECTRUM LEVEL
SPEPB		BB EMTR SPECTRUM LEVEL AT f_{ep}
SPEPN		NB EMTR SPECTRUM LEVEL AT f_{ep}
SPESB		BB EMTR SPECTRUM LEVEL AT f_{es}
SPESN		NB EMTR SPECTRUM LEVEL AT f_{es}

5.3.9 Name: EMINTS

DESCRIPTION

EMINTS computes the broadband and narrowband components of the integrated EMI margin between two scan frequencies supplied by TORS, the calling routine. For the initial pass through EMINTS, the parameters at the scan frequency are converted from dB to numeric ratios and stored. During subsequent passes, the broadband integral and the narrowband summation are computed, in numeric ratio form, and the routine returns to TORS.

The broadband component is computed assuming a log-linear curve between points. The integral expression of this curve is evaluated. Where the slope is too steep (exponent greater than $\pm$ 25), a straight-line integration (trapezoidal rule) is used.

The narrowband signal is assumed to consist of delta-functions spaced one per bandwidth between the two scan frequencies. Their amplitudes are assumed to vary linearly over this range. The integral is therefore a summation which is evaluated by EMINTS.

DATA REQUIREMENTS

ARGUMENTS:

EMN2 - narrowband EMI margin at F2

EMB2 - broadband EMI margin at F2

F1 - lower integrating freq limit

F2 - upper integrating freq limit

F2DB - F2 in dB

BWF2 - bandwidth factor at F2 in dB/MHz

G12N - narrowband integrated EM component returned

G12B - broadband integrated EM component returned

COMMON BLOCKS: none

TABLE 97

EMINTS VARIABLES

PROGRAM NAME	DEFINITION
A	EXPONENT OF LOG-LINEAR CURVE
AM	RATIO OF BANDWIDTH-TO-INTERVAL
AP1	A PLUS 1
BWFHZ2	BANDWIDTH FACTOR IN dB/Hz AT F2
BWFN	BWFHZ2 IN HERTZ
EMB1	BB EMI MARGIN AT F1 IN dB
EMB1N	EMB1 AS RATIO (NUMERIC)
EMB2N	EMB2 AS RATIO
EMN1	NB EMI MARGIN AT F1 IN dB
EMN	EMN1 AS RATIO
EMN2N	EMN2 AS RATIO
F1DB	F1 IN dB
LSEM1B	LOGICAL = TRUE IF EMB1 GREATER THAN -900 dB
LSEM2B	LOGICAL = TRUE IF EMB2 GREATER THAN -900 dB

5.3.10 Name: PEMPNT

DESCRIPTION

This subroutine prints all EMI margin outputs for emitter/receptor pairs for CEAR and SGR. Margins at both emitter and receptor table frequencies are printed in a single table, sorted by ascending frequency. To identify the table from which a given frequency was taken, "EMTR" or "RCPT" is printed next to the frequency. Also, the routine suppresses broadband and narrowband outputs at a given frequency where the EMI margin is below -900 dB. (This is not to be confused with the user-supplied printout limit EMPL.) For the SGR emitter adjustment output, the routine computes and prints EMI margins to the adjusted emitter spectrum.

DATA REQUIREMENTS

ARGUMENTS:

IPRNT = 1 CEAR - baseline system

2 CEAR - added port(s)

3 CEAR - no path in baseline system

4 CEAR - comparative EMI summary

5 CEAR - no path in modification system

6 SGR - unresolved interference

7 SGR - adjusted emitter spectra

COMMON BLOCKS:

IOUNIT, PRTWRK, CEARV, EMCASC, EMBSLN

TABLE 98

PEMPNT VARIABLES

PROGRAM NAME	SYMBOL	DEFINITION
AEPNT		LOGICAL = TRUE IF IPRNT=7
BLANK		ALPHA = ALL BLANKS
CMPNT		LOGICAL = TRUE IF IPNT=4
DIFF		CHANGE IN INTEGRATED EMI MARGIN
EMB		BB EMI MARGIN
EMD		DIFFERENCE BETWEEN MODIFIED AND BASELINE EMI MARGINS
EMN		NB EMI MARGIN
EMTR		ALPHA = "EMTR"
FQEP	f_{ep}	PREVIOUS EMTR SEARCH FREQ
FQEPDB		f_{ep} IN DB
FQEPL		LOWER FREQ INTERVAL BOUNDARY FOR f_{ep}
FQEPU		UPPER FREQ INTERVAL BOUNDARY FOR f_{ep}
FQES	f_{es}	EMTR SEARCH FREQ
FQESDB		f_{es} IN DB
FQRL		LOWER FREQ INTERVAL BOUNDARY FOR f_{rs}
FQRS	f_{rs}	RCPT SEARCH FREQ
FQRSDB		f_{rs} IN DB
FQTRM		HIGHEST COMMON FREQ IN RCPT TABLE
FQRU		UPPER FREQ INTERVAL BOUNDARY FOR f_{rs}
IGT		FLOW CONTROL VARIABLE
I		GENERAL INDEX
ICTD		CONTINUATION CODE (=1 FIRST PAGE; =2 CONTINUED PAGE)
IFQEP		INDEX OF f_{ep}

TABLE 98 (Concluded)

PROGRAM NAME	SYMBOL	DEFINITION
IFQES		INDEX OF f_{es}
IFQRS		INDEX OF f_{rs}
INT		ALPHA = "I"
INTR		ALPHA = "I" OR BLANK
LINE		LINE COUNTER
LP		MAX LINES PER PAGE
NAEPNT		LOGICAL = TRUE IF IPRNT $\neq$ 7
RCPT		ALPHA = "RCPT"
RFRE		ALPHA = "REQD" IF IN EMTR REQD FREQ RANGE, ELSE = BLANK
RFRR		ALPHA = "REQD" IF IN RCPT REQD FREQ RANGE, ELSE = BLANK
RQ		ALPHA = "REQD"
RSIGB		BB RECEIVED SIGNAL
RSIGN		NB RECEIVED SIGNAL
SGBB		LOGICAL = TRUE IF BB EMI MARGIN EXCEEDS -900 DB
SGNB		LOGICAL = TRUE IF NB EMI MARGIN EXCEEDS -900 DB
SLIM		RATIO OF EMTR SPECTRUM TO ADJUST LIMIT (DB)
SLIMR		RATIO OF RCPT SPECTRUM TO ADJUST LIMIT (DB)
SPEB		INTERPOLATED EMITTER BB SPECTRUM LEVEL AT f_{rs}
SPEN		INTERPOLATED EMITTER NB SPECTRUM LEVEL AT f_{rs}
SPEPB		EMTR BB SPECTRUM LEVEL AT f_{ep}
SPEPN		EMTR NB SPECTRUM LEVEL AT f_{ep}
SPESB		EMTR BB SPECTRUM LEVEL AT f_{es}
SPESN		EMTR NB SPECTRUM LEVEL AT f_{es}
UPRNT		LOGICAL = TRUE IF IPRNT=6

5.3.11 Name: TEMPNT

DESCRIPTION

This subroutine prints EMI margins from the total received signal to a receptor port for CEAR and SGR.

DATA REQUIREMENTS

ARGUMENTS:

IPRNT = 1 baseline system

2 added port(s)

3 no path in baseline system

4 comparative EMI summary

COMMON BLOCKS:

IOUNIT, EMBSLN, EMCASAC, PRTWRK

TABLE 99

TEMPNT VARIABLES

PROGRAM NAME	SYMBOL	DEFINITION
BLANK		ALPHA = ALL BLANKS
EMD		DIFFERENCE IN MODIFIED AND BASELINE EMI MARGINS
FQRL		LOWER FREQ INTERVAL BOUNDARY FOR F
FQRU		UPPER FREQ INTERVAL BOUNDARY FOR F
FREQ	f	FREQ OF INTEREST
ICTD		CONTINUATION CODE (=1 FIRST PAGE; =2 CONTINUED PAGE)
IFRQ		INDEX OF F
LINE		LINE COUNTER
LP		MAX LINES PER PAGE
RFR		ALPHA = "R" IF F IN RCVR REQD FREQ RANGE, ELSE = BLANK
RQ		ALPHA = "R"

5.3.12 Name: HEADER

DESCRIPTION

Prints page header for SGR and CEAR outputs.

DATA REQUIREMENTS

ARGUMENTS:

IPRNT - print code (See 5.3.10)

ICTD - continuation code

ICALL - calling subroutine code

COMMON BLOCKS:

IOUNIT, PRTWRK

TABLE 100

HEADER VARIABLES

PROGRAM NAME	DEFINITION
CHG	"CHANGED" TABLE ARRAY
CTD	"CONTD" LABEL ARRAY
EMTR	CHARACTERS: "EMTR"
HDG	HEADING: "BASELINE" OR "MODIFIED"
I	INDEX
IHDG	HDG INDEX
PTHCD1	PATH CODE LABEL ARRAY
PTHCD2	PATH CODE LABEL ARRAY
RCPT	CHARACTERS: "RCPT"

5.3.13 Name: WASSR

DESCRIPTION

The Waiver Analysis Spectrum Shift Routine shifts emitter or receptor spectrum levels for waiver analysis. It also prints a summary of the shifts for each spectrum.

DATA REQUIREMENTS

ARGUMENTS:

IEMRC - emtr/rcpt spectrum code

ICHNG - Changed/unchanged code

INP - new page code

COMMON BLOCKS:

IOUNIT, PRTWRK, CEARV

TABLE 101

WASSR VARIABLES

PROGRAM NAME	DEFINITION
D	DISPLACEMENT
EMTR	CHARACTERS: "EMTR"
FREQ	FREQUENCY
F1	LOWER SHIFT FREQ LIMIT
F2	UPPER SHIFT FREQ LIMIT
I	INDEX
IDS	ID ARRAY
IFRQ	FREQ INDEX
IS	LOOPING INDEX
RCPT	CHARACTERS: "RCPT"

5.3.14 Name: SLINT

DESCRIPTION

Linear interpolation routine

DATA REQUIREMENTS

ARGUMENTS:

X1, Y1 - coordinates of lower known point

X2, Y2 - coordinates of upper known point

X - abscissa of desired ordinate

COMMON BLOCKS: None

LOCAL VARIABLES: None

5.3.15 Name: FQTINT

DESCRIPTION

Determine interval boundary frequencies for given table frequency.

DATA REQUIREMENTS

ARGUMENTS:

FQT - frequency table

FQTC - center frequency of interval from table FQT

IFQ - index of FQTC in FQT

IFQMX - highest index in table

FQTL - lower interval boundary frequency (returned)

FQTU - upper interval boundary frequency (returned)

COMMON BLOCKS: None

LOCAL VARIABLES: None

5.3.16 Name: PAREAD

DESCRIPTION

Reads and decodes run parameters for TART.

DATA REQUIREMENTS

ARGUMENTS: None

COMMON BLOCKS:

IOUNIT, FLAG, ERR, XYZ

TABLE 102

PAREAD VARIABLES

PROGRAM NAME	DEFINITION
A	CHARACTER "A"
AI	ADDITIONAL INPUT TEST ARRAY
B	CHARACTER "B"
BLANK	BLANK CHARACTER
CARD	ARRAY CONTAINING CARD INPUT, ONE CHARACTER/WORD
CI	CHARACTER "I"
COMMA	CHARACTER ","
D	CHARACTER "D"
EQUALS	CHARACTER "="
I	INDEX
ICHR	CHARACTER INDEX
ICOD	START COLUMN OF TASK CODE IN CARD
IPRM	PARAMETER INDEX
IRUNA	RUN CODE ON START CARD
IRUNA1	IRUNA+1
IRUN1	IRUN+1
J	INDEX
P	CHARACTER "P"
S	CHARACTER "S"
SP	SUPPLEMENTAL PRINTOUT TEST ARRAY
TSKCD	ARRAY OF ALL TASK CODES
TSKCRD	TASK CODE SPECIFIED ON START CARD

5.3.17 Name: SYSDR

DESCRIPTION

Reads system and run data from IDIPR-generated new ISF and ARRAY files.

DATA REQUIREMENTS

ARGUMENTS:

None

COMMON BLOCKS:

IOUNIT, IOUWK, IOUSCF, PRTWRK, ISFE, ISFR, ATAWRK, TITLE, ERR, FLAG, SYS2, XYZ, ISF, CEARV, RCDI, INDX

TABLE 103

SYSDR VARIABLES

PROGRAM NAME	DEFINITION
I	INDEX
IE	EQUIPMENT INPUT INDEX
IF	FILER INPUT INDEX
IR	NO. OF CHARACTERS IN REMARK
IT	NO. OF CHARACTERS IN TITLE
ITXX	INDEX OF ARRAY FILE
IW	WAIVER INPUT INDEX
J	INDEX
NP	NO. OF PORTS
OUTPT	= TRUE IF OUTPUT DESIRED OF DATA AS READ-IN

5.3.18 Name: COUPLE

DESCRIPTION

Subroutine COUPLE tests for and evaluates the electromagnetic coupling between a given emitter port and receptor port. The four coupling paths permitted are antenna-to-antenna, antenna-to-wire, wire-to-wire, and equipment case-to-equipment case. If a path exists, the coupling transfer functions are evaluated over the frequencies common to both emitter and receptor.

Antenna-to-antenna and antenna-to-wire coupling are evaluated by the subroutine ACTFER, wire-to-wire coupling is evaluated by the subroutine WTWTFR, and case-to-case coupling is evaluated by CTCTFR. The wire map file is used in the evaluation of antenna-to-wire or wire-to-wire coupling.

The contributions of any filters connected to emitter and receptor terminals are included in the total transfer functions. COUPLE also calls ENVIRN to calculate coupling between an environmental electromagnetic field and receptor ports.

DATA REQUIREMENTS

ARGUMENTS:

None

COMMON BLOCKS:

IOUNIT, IOUSCF, PRTWRK, ISFE, ISFR, ATAWRK, ERR, SYS2, XYZ, ISF, RCDI, TITLE,

FLAG, CEARV, WIRE, FILTER

TABLE 104

COUPLE VARIABLES

PROGRAM NAME	DEFINITION
D	MEASURE OF ANTENNA SEPARATION
F1	TEMPORARY FREQUENCY
F1E	LOWEST EMITTER FREQUENCY
F1R	LOWEST RECEPTOR FREQUENCY
F2	TEMPORARY FREQUENCY
F2E	HIGHEST EMITTER FREQUENCY
F2R	HIGHEST RECEPTOR FREQUENCY
I	COUNTING INDEX
IB	BAND INDEX
IBNDLE	BUNDLE INDEX
IDBN	BUNDLE ID OF LAST BUNDLE PROCESSED
IDEC	DECODED ID
IDECW	DECODED WIRE ID
IFTR	FILTER INDEX
II	COUNTING INDEX
ILOC	LOCATION INDEX (FOR FILTER MESSAGE)
IPORT	PORT INDEX OF LAST WIRE PORT PROCESSED
ISIDR	TABLE OF SIDE CODE VS RECEPTOR WIRE SEGMENTS
ISIDS	SIDE CODE OF AN EMITTER WIRE SEGMENT
ISSIDE	SIDE CODE OF A RECEPTOR WIRE SEGMENT
IWE	EMITTER WIRE INDEX
J	GENERAL INDEX
JW	COMPLEX ANGULAR FREQUENCY (jw)

TABLE 104 (Concluded)

PROGRAM NAME	DEFINITION
KBUN	BUNDLE INDEX
NCPSEG	NUMBER OF COUPLED SEGMENTS
TE	TABLE OF VOLTAGE TRANSFER FUNCTION OVER EMITTER FREQUENCIES
TR	TABLE OF VOLTAGE TRANSFER FUNCTION OVER RECEPTOR FREQUENCIES
TWOPIJ	CONSTANT EQUAL TO $2\pi j$
YE	TABLE OF TOTAL ADMITTANCE SEEN BY EMITTER WIRE
YR	TABLE OF TOTAL ADMITTANCE SEEN BY RECEPTOR WIRE

5.3.19 Name: ACTFER

DESCRIPTION

This subroutine is the principal driver for antenna-coupled transfer functions: antenna-to-antenna and antenna-to-wire coupling. It sets up the appropriate data parameters, calls the appropriate model subroutines, and computes the transfer ration at all emitter (transmitter) and receptor common frequencies.

For antenna-to-antenna coupling, ACTFER identifies the antennas used by both emitter and receptor ports and places the appropriate parameters in working common blocks. It then calls the appropriate propagation model (aircraft, spacecraft, ground) to obtain the path loss at a normalized frequency of 1 GHz. (If wing shading is present between antennas this is computed for both forward and aft edge.) Antenna look-angles are then computed, and the antenna model routine is called for the gains. The transfer models are then evaluated at all emitter and receptor frequencies.

For antenna-to-wire, the subroutine sets up the parameters for the emitter antenna. It then cycles through each wire bundle segment of the receptor wire, and when a segment is encountered which is exposed by a dielectric aperture, the appropriate parameters for the aperture are set up for the model routines. ACTFER next cycles through each aperture, first using the antenna and propagation models to compute the transfer from the emitter antenna to the electromagnetic field at the aperture. Then the field-to-wire subroutine FTW computes the transfer from the aperture to the exposed wire segment at all frequencies. The normalized power coupled to the port load from each exposing aperture is summed during this cycling. Finally the transfer arrays are converted to dB.

DATA REQUIREMENTS

ARGUMENTS:

None

COMMON BLOCKS:

IOUNIT, ERR, PRTWRK, ISFE, ISFR, ATAWRK, SYS2, XYZ, ISF, RCDI, WIRE, CFARV

TABLE 105

ACTFER VARIABLES

PROGRAM NAME	SYMBOL	DEFINITION
APL		APERTURE LENGTH
APW		APERTURE WIDTH
ASIZR		MAXIMUM DIMENSION OF RCPT ANTENNA OR APERTURE
ASIZX		MAXIMUM DIMENSION OF EMITTER ANTENNA
ASZD		MAX OF ASZRD AND ASZXD
ASZRD		20 LOG_{10} (ASIZR)
ASZXD		20 LOG_{10} (ASIZX)
AWRTO		APERTURE E-FIELD TO WIRE LOAD TRANSFER RATIO
CEMTR		CAPACITANCE OF EMITTER PORT LOAD
CITM		CONVERSION FACTOR FROM INCHES TO METERS
CRCPT		CAPACITANCE OF RCPT PORT LOAD
DC1H		HOLDING VARIABLE FOR DC1
DC2H		HOLDING VARIABLE FOR DC2
DDB		20 LOG_{10} (DMIN)
DDBH		HOLDING VARIABLE FOR DDB
DEGRAD		CONVERSION FACTOR FROM DEGREES TO RADIANS
DMINH		HOLDING VARIABLE FOR DMIN
EFLD		EMTR ANT TO APERTURE E-FIELD COUPLING AT NORMALIZED FREQ
EFLDH		HOLDING VARIABLE FOR EFLD
EXPLTH		LENGTH OF WIRE EXPOSED TO E-FIELD
FQRDB		10 LOG_{10} (FREQ)

TABLE 105 (Continued)

PROGRAM NAME	SYMBOL	DEFINITION
FRQDB2		20 LOG_{10} (FREQ)
G		SUM OF GX+GR IN DB
GH		HOLDING VARIABLE FOR G
GR		RCPT ANTENNA GAIN
GRH		HOLDING VARIABLE FOR GR
GX		EMTR (XMTR) ANTENNA GAIN
GXH		HOLDING VARIABLE FOR GX
I		GENERAL INDEX
IALPH		GENERAL UNPACKED ALPHA CODE ARRAY FOR ERROR MESSAGE
IANTX		EMTR ANTENNA INDEX
IAP		APERTURE INDEX
IDANT		ARRAY OF ANT ID'S (PACKED)
IDANTR		RCPT ANT ID (PACKED)
IDANTX		EMTR ANT ID (PACKED)
IDAPR1		RCPT APERTURE ID (PACKED)
IFC1		START FREQ INDEX
IFC2		STOP FREQ INDEX
IFQ		FREQ INDEX
IROH		HOLDING VARIABLE TO IRO (SEE COMMON ATAWRK)
IROXH		HOLDING VARIABLE FOR IROX (SEE ATAWRK)
ISEG		WIRE SEGMENT INDEX
ISHH		HOLDING VARIABLE FOR ISH (SEE ATAWRK)
ISHLD		SHIELD CODE

TABLE 105 (Continued)

PROGRAM NAME	SYMBOL	DEFINITION
ISHWH		HOLDING VARIABLE FOR ISHW (SEE ATAWRK)
ISIDR		VALUE OF IRSIDE FOR GIVEN WIRE SEGMENT
IWCT		WIRE CHARACTERISTICS TABLE INDEX
IWTID		WIRE CHARACTERISTICS TABLE ID (PACKED)
LATA		LOGICAL = TRUE IF ANTENNA-TO-ANTENNA
LATW		LOGICAL = TRUE IF ANTENNA-TO-WIRE
LEMTR		INDUCTANCE OF RCPT PORT LOAD
LRCPT		INDUCTANCE OF EMTR PORT LOAD
M		LOGIC FLOW CONTROL IN ANT GAIN CALCULATION
MWSH		WING EDGE CODE (1 = FWD, 2 = AFT EDGE)
NCPSEG		NO. OF COUPLED WIRE SEGMENTS
NRPM		NO. OF PARAMETERS
PH	ϕ	AZIMUTHAL ANTENNA LOOK-ANGLE
PHR	ϕ_R	ϕ FOR RCPT ANT
PHX	ϕ_X	ϕ FOR EMTR ANT
PHOR	ϕ_{OR}	ϕ ANGLE OF BEAM PEAK OF RCPT ANT
PHOX	ϕ_{OX}	ϕ ANGLE OF BEAM PEAK OF EMTR ANT
PI	π	3.14159265
PI2	2π	6.28319
PRP		PROPAGATION FACTOR
PRPA		PROPAGATION FACTOR AROUND AFT END OF WING
PRPF		PROPAGATION FACTOR AROUND FWD END OF WING
PRPH		HOLDING VARIABLE FOR PRP

TABLE 105 (Continued)

PROGRAM NAME	SYMBOL	DEFINITION
REMTR		RESISTANCE OF EMTR PORT LOAD
RHO1	ρ_1	CYLINDRICAL COORDINATE OF ANTENNA LOCATION FOR LOOK-ANGLE COMPUTATION
RHO2	ρ_2	CYLINDRICAL COORDINATE OF REMOTE POINT LOCATION FOR LOOK-ANGLE COMPUTATION
RRCPT		RESISTANCE OF RCPT PORT LOAD
SFCH		HOLDING VARIABLE FOR SFC (SEE ATAWRK)
SFWH		HOLDING VARIABLE FOR SFW (SEE ATAWRK)
SFWP		UNNORMALIZED WING SHADING FACTOR
SFWPH		HOLDING VARIABLE FOR SFWP
TFS		FREE SPACE TRANSMISSION FACTOR AT NORMALIZED FREQ
TFSH		HOLDING VARIABLE FOR TFS
TFSP		UNNORMALIZED TFS
TFSPH		HOLDING VARIABLE FOR TFSP
TH	θ	ELEVATION LOOK-ANGLE
THR	θ_R	θ FOR RCPT ANT
THX	θ_X	θ FOR EMTR ANT
THOR	θ_{OR}	BEAM PEAK θ ANGLE FOR RCPT ANT
THOX	θ_{OX}	BEAM PEAK θ ANGLE FOR EMTR ANT
TS1H	θ_{S1}	HOLDING VARIABLE FOR TS1 (SEE ATAWRK)
TS2H	θ_{S2}	HOLDING VARIABLE FOR TS2 (SEE ATAWRK)
T1	θ_1	θ CYLINDRICAL COORDINATE OF ANT LOCATION
T2	θ_2	θ CYLINDRICAL COORDINATE OF REMOTE LOCATION POINT

TABLE 105 (Concluded)

PROGRAM NAME	SYMBOL	DEFINITION
W	ω	$2\pi f$
WRAD		WIRE RADIUS
WSEP		WIRE SEPARATION
X		X-COORDINATE OF APERTURE
X1		X-COORDINATE OF ANT LOCATION
X2		X-COORDINATE OF REMOTE POINT
Y		Y-COORDINATE OF APERTURE
YE		ADMITTANCE OF EMTR LOAD
YFAR		ADMITTANCE OF FAR END LOAD OF WIRE SEGMENT
YNEAR		ADMITTANCE OF NEAR END LOAD OF WIRE SEGMENT
YRCPT		ADMITTANCE OF RCPT LOAD
Y1		Y-COORDINATE OF ANT LOCATION
Y2		Y-COORDINATE OF REMOTE POINT
Z		Z-COORDINATE OF APERTURE
ZL		LOAD IMPEDANCE (LOAD END)
ZO		LOAD IMPEDANCE (GENERATOR END)
Z1		Z-COORDINATE OF ANT LOCATION
Z2		Z-COORDINATE OF REMOTE POINT

5.3.20 Name: AIRCFT

DESCRIPTION

AIRCFT, called by ACTFER, is the control subroutine for electromagnetic propagation model from an antenna on a winged vehicle to another antenna or an aperture. The routine checks the locations of the emitter antenna and receptor antenna or aperture (point) relative to the wings and fuselage and determines if wing shading is possible. If it is, the WINGSH subroutine is called for further testing and path length and wing shading calculation. If the wings are not in the propagation path, CYLMDL is called directly to compute the path length and fuselage shading, if present.

AIRCFT first tests whether both antennas (or antenna and aperture) are forward or both are aft of the wings. If this is the case, there is no wing shading, and CYLMDL is called. If this test fails, a test is made of the antenna locations around the fuselage (as viewed from the nose) to determine their relative locations to the wings. If a wing is in the shortest path, WINGSH is called; and if not, CYLMDL is called.

DATA REQUIREMENTS

ARGUMENTS:

None

COMMON BLOCKS:

XYZ, ISF, ATAWRK

TABLE 106

AIRCFT VARIABLES

PROGRAM NAME	SYMBOL	DEFINITION
IREG		REGION CODE AROUND FUSELAGE OF XMTR ANT
IREGR		REGION CODE AROUND FUSELAGE OF RCPT ANT OR APERTURE
JPT		CONTROL VARIABLE
JTABL		TABLE OF PATH CODES FOR GIVEN IREG AND IREGR
LWA		WING ANTENNA LOCATION CODE BEING CONSIDERED
NG		LOOP CONTROL VARIABLE
PI	π	3.14159265
PIOV2	$\pi/2$	1.5707963
PI2	2π	6.2831853
PI32	$3\pi/2$	4.7123889
TA	θ_A	AVERAGE OF θ COORDINATES BETWEEN ANTENNAS
TEMP		TEMPORARY HOLDING VARIABLE

5.3.21 Name: WINGSH

DESCRIPTION

WINGSH is called first by AIRCFT if a wing is possibly in the propagation path. A more sophisticated test is then performed by WINGSH using either a straight line or a spiral around the fuselage between the antennas (or antenna and aperture). If the wing is not in the path, CYLMDL is called, and no wing shading is computed.

If the wing is in the path, the path around the wing giving minimum path loss is determined. The point on the forward wing edge nearest the fuselage is selected, and the path loss, including free space and wing and fuselage shading, is computed. The parameters for this point are held, the test point is moved 1/10th of the distance to the wing tip, and the path loss is again computed. The newly calculated path loss and previous loss are compared. If the loss decreases, the test point is moved again towards the wing tip, and the above repeated. If the path loss increases or the wing tip is reached, the path parameters from the previous test point are selected as the minimum. The routine then returns to ACTFER which adds the antenna gains, holds the net path loss for the forward wing edge, and calls WINGSH again directly. WINGSH then repeats the process for the aft wing edge and returns. ACTFER adds the gains for the aft edge and selects the path with the minimum path loss at each frequency.

DATA REQUIREMENTS

ARGUMENTS:

MODE = 1 INITIAL PASS (TEST AND FWD WING EDGE)

2 SECOND PASS (AFT WING EDGE ONLY)

COMMON BLOCKS:

PRTWRK, ATAWRK, SYS2, XYZ, ISF, CEARV, RCDI

TABLE 107

WINGSH VARIABLES

PROGRAM NAME	SYMBOL	DEFINITION
ANG		TEMP PARAMETER
AR	α_R	INCIDENCE ANGLE FROM WING POINT TO RCPT ANT
AX	α_X	INCIDENCE ANGLE FROM EMTR ANT TO WING POINT
BA		PARAMETER USED WING PLANE EQUATION
COSAWX		COSINE OF WING EDGE ROTATION ANGLE OF X-AXIS
COSAWZ		COSINE OF WING EDGE ROTATION ANGLE OF Z-AXIS
CSC		CSC 1/2 $(\alpha_r + \alpha_x)$
DAW		TEMP VARIABLE FOR SINAWX AND COSAWX COMPUTATION
DAWZ		TEMP VARIABLE FOR SINAWZ AND CDSAWZ COMPUTATION
DC1H		HOLDING VARIABLE FOR DC1
DC2H		HOLDING VARIABLE FOR DC2
DEN		DENOMINATOR OF SHADING EQUATION
DWX		Δ X OF WING ROOT AND TIP POINTS
DWY		Δ Y OF WING ROOT AND TIP POINTS
DWZ		Δ Z OF WING ROOT AND TIP POINTS
DXA		XXA - XRA
DXRW		PARAMETER USED IN AXIS ROTATION TO WING EDGE
DXX		XI - WRBL
DXXW		PARAMETER USED IN AXIS ROTATION TO WING EDGE
DYRW		PARAMETER USED IN AXIS ROTATION TO WING EDGE

TABLE 107 (Continued)

PROGRAM NAME	SYMBOL	DEFINITION
DYXW		PARAMETER USED IN AXIS ROTATION TO WING EDGE
DZRW		PARAMETER USED IN AXIS ROTATION TO WING EDGE
DZXW		PARAMETER USED IN AXIS ROTATION TO WING EDGE
IROH		HOLDING VARIABLE FOR IRO
IROXH		HOLDING VARIABLE FOR IROX
IROXW		TRANSMITTER-TO-WING PATH CODE
MA		PARAMETER USED IN WING PLANE EQUATION
MW		PARAMETER USED IN WING PLANE EQUATION
MWY		SLOPE PARAMETER USED IN LINE EQUATION OF WING EDGE
MWZ		SLOPE PARAMETER USED IN LINE EQUATION OF WING EDGE
PF		PROPAGATION FACTOR
PFP		PREVIOUSLY CALCULATED PROPAGATION FACTOR
PI	π	3.14159265
PI2	2π	6.2831853
PO5		.05
RCSC		RECIPROCAL OF CSC
RHOA	ρ_A	ρ-COORDINATE OF POINT AT END OF LINE SEGMENT TO WING POINT
RHOAH		HOLDING VARIABLE FOR ρ_A
RHORH		HOLDING VARIABLE FOR ρ_R
RHORW	ρ_{RW}	ρ-COORDINATE OF POINT AT END OF LINE SEG FROM WING POINT TO RCPT ANT
RHOWH		HOLDING VARIABLE FOR ρ_W

TABLE 107 (Continued)

PROGRAM NAME	SYMBOL	DEFINITION
RHOXH		HOLDING VARIABLE FOR ρ_X
RHOXW	ρ_{XW}	ρ-COORDINATE OF POINT AT END OF LINE SEG FROM XMTR ANT TO WING POINT
RSEC		RECIPROCAL OF SEC
SEC		SEC 1/2 $(\alpha_R - \alpha_X)$
SFCH1		HOLDING VARIABLE FOR SFC1
SFCWR		CYLINDRICAL SHADING FACTOR FROM WING TO RCPT ANT
SFCXW		CYLINDRICAL SHADING FACTOR FROM XMTR TO WING
SFC1		HOLDING VARIABLE FOR SFC
SFWH1		HOLDING VARIABLE FOR SFW1
SINAWX		SINE OF WING EDGE ROTATION ANGLE OF X-AXIS
SINAWZ		SINE OF WING EDGE ROTATION ANGLE OF Z-AXIS
TA	θ_A	θ-COORDINATE OF POINT AT END OF LINE SEG TO WING POINT
TAH		HOLDING VARIABLE FOR θ_A
TFS		FREE SPACE TRANSMISSION FACTOR
TRA		HOLDING VARIABLE FOR θ_R REFLECTED TO RIGHT SIDE OF VEHICLE
TRH		HOLDING VARIABLE FOR θ_R
TRH1		HOLDING VARIABLE FOR θ_R
TRW	θ_{RW}	θ-COORDINATE OF POINT AT END OF LINE SEGMENT FROM WING POINT TO RCPT ANT
TR1	θ_{R1}	PARAMETER USED IN SPIRAL INTERCEPT EQUATION
TS1H		HOLDING VARIABLE FOR θ_{S1}

TABLE 107 (Continued)

PROGRAM NAME	SYMBOL	DEFINITION
TS2H		HOLDING VARIABLE FOR θ_{S2}
TWC	θ_{WC}	θ-COORDINATE OF WING ROOT
TWH		HOLDING VARIABLE FOR θ_W
TXA		HOLDING VARIABLE FOR θ_X REFLECTED TO RIGHT SIDE OF VEHICLE
TXH		HOLDING VARIABLE FOR θ_X
TXH1		HOLDING VARIABLE FOR θ_X
TXW	θ_{XW}	θ-COORDINATE OF POINT AT END OF LINE SEGMENT FROM XMTR ANT TO WING
TX1	θ_{X1}	PARAMETER USED IN SPIRAL INTERCEPT EQUATION
WLR		WATER-LINE OF RCPT ANT
WLX		WATER-LINE OF EMTR ANT
WRBL1		HOLDING VARIABLE FOR WRBL (SEE ATAWRK)
XI		X-COORDINATE OF WING PLANE INTERCEPT POINT
XINCR		WING POINT X-COORDINATE INCREMENT FOR POINT MOVEMENT
XRA		HOLDING VARIABLE FOR X_R REFLECTED TO RIGHT SIDE OF VEHICLE
XR1		HOLDING VARIABLE FOR X_R
XWH		HOLDING VARIABLE FOR X_W
XW1		TEMP VARIABLE USED IN WING POINT Y_W AND Z_W CALCULATION
XXA		HOLDING VARIABLE FOR X_X REFLECTED TO RIGHT SIDE OF VEHICLE
XX1		X_{XW} IN ROTATED COORDINATE SYSTEM (TO WING EDGE)

TABLE 107 (Continued)

PROGRAM NAME	SYMBOL	DEFINITION
XX2		X_{WR} IN ROTATED COORDINATE SYSTEM
YI		Y-COORDINATE OF WING PLANE INTERCEPT POINT
YRA		HOLDING VARIABLE FOR X_R REFLECTED TO RIGHT SIDE OF VEHICLE
YR2		Y_{WR} IN ROTATED COORDINATE SYSTEM
YWF		Y-COORDINATE OF WING ROOT
YWH		HOLDING VARIABLE FOR Y_W
YXA		HOLDING VARIABLE FOR Y_X REFLECTED TO RIGHT SIDE OF VEHICLE
YX2		Y_{XW} IN ROTATED COORDINATE SYSTEM
YZ2		TEMP HOLDING VARIABLE
Z		Z-COORDINATE SPIRAL INTERCEPT POINT
ZA	z_a	Z-COORDINATE OF POINT AT END OF LINE SEGMENT TO WING POINT
ZAH		HOLDING VARIABLE FOR Z_A
ZI		Z-COORDINATE OF WING PLANE INTERCEPT POINT
ZIA		Z-COORDINATE OF INTERSECTION OF LINE PARALLEL TO Z-AXIS THROUGH WING INTERCEPT POINT AND AFT WING EDGE
ZIF		Z-COORDINATE OF INTERSECTION OF LINE PARALLEL TO Z-AXIS THROUGH WING INTERCEPT POINT AND FWD WING EDGE
ZRA		HOLDING VARIABLE FOR Z_R
ZRH		HOLDING VARIABLE FOR Z_R
ZRW		Z-COORDINATE OF POINT AT END OF LINE SEGMENT FROM WING TO RCPT ANT

TABLE 107 (Concluded)

PROGRAM NAME	SYMBOL	DEFINITION
ZR2		Z_{XW} IN ROTATED COORDINATE SYSTEM
ZWF		Z-COORDINATE OF WING ROOT POINT
ZWH		HOLDING VARIABLE FOR Z_W
ZWT		Z-COORDINATE OF WING TIP POINT
ZXA		HOLDING VARIABLE FOR Z_X
ZXH		HOLDING VARIABLE FOR Z_X
ZXW		Z-COORDINATE OF POINT AT END OF LINE SEGMENT FROM XMTR ANT TO WING
ZX2		ZWR IN ROTATED COORDINATE SYSTEM

5.3.22 Name: CYLMDL

DESCRIPTION

This subroutine computes path length and shading factors between two points on or near a cylindrical body with a conical nose, representing an aircraft fuselage or spacecraft. The body has no wings, and at the user's option, it may have a round or flat bottom. CYLMDL is called by ACTFER for a spacecraft and by AIRCFT and WINGSH for aircraft where a wing is not in the path between antennas. WINGSH also uses CYLMDL for transmitter antenna-to-wing and wing-point-to-receptor-antenna (or aperture) path length and cylindrical shading computation. There are three curves used in CYLMDL in various combinations to determine the path over the body with minimum length: straight line, cylindrical spiral, and conical spiral. First, the routine tests to see if a straight line only can be used for the path. If not, it tests the relation of each path termination point to the body.

When both points are on the body, the points are tested in relation to the conical nose base z-coordinate (FSN). If both points are forward of FSN, a conical spiral is fitted between them, and the curve length is computed. If one or both points are aft of FSN the cylindrical spiral is used.

When one point is on the body and the other is off, a combination straight line and cylindrical spiral is used for the path. The tangent point on the body joining the two path segments producing the minimum total length is computed. With both points off of the body, a test is made to see if a straight line between the points intersects the body. If it does not, the straight line is used. If it does intersect, a three segment path consisting of two straight line segments and a cylindrical spiral around the body is used. In this case, two tangent points are computed.

DATA REQUIREMENTS

ARGUMENTS:

None

COMMON BLOCKS:

ATAWRK, XYZ, PRTWRK, SYS2, XYZ, ISF, CEARV, RCDI

TABLE 108

CYLMDL VARIABLES

PROGRAM NAME	SYMBOL	DEFINITION
A		STRAIGHT LINE DIST FROM OFF BODY POINT TO TANGENT POINT
ANGLE		INTERMEDIATE ANGLE
ANGLR		INTERMEDIATE ANGLE FOR RCPT POINT
ANGLX		INTERMEDIATE ANGLE FOR XMTR POINT
ARR		STRAIGHT LINE DIST FROM RCPT POINT OFF BODY TO TANGENT POINT
AXX		STRAIGHT LINE DIST FROM XMTR POINT OFF BODY TO TANGENT POINT
A1		TEST ANGLE USED TO DETERMINE θtx AND θtr
A2		TEST ANGLE USED TO DETERMINE θtx AND θtr
B		INTERMEDIATE PARAMETER
BAXX		INTERMEDIATE PARAMETER
D		INTERMEDIATE PARAMETER
D1		TOTAL STRAIGHT LINE DIST BETWEEN TWO OFF-BODY POINTS
E		INTERMEDIATE PARAMETER
PI	π	3.1415926
PI2	2π	6.2831853
RD		INTERMEDIATE PARAMETER
RHOA	ρA	ρ-COORDINATE OF OFF-BODY POINT
RHOB	ρB	ρ-COORDINATE OF ON-BODY POINT
RHOL	ρL	LENGTH OF SHORTEST LINE BETWEEN Z-AXIS AND LINE JOINING TWO OFF-BODY POINTS
SAB		INTERMEDIATE PARAMETER

TABLE 108 (Concluded)

PROGRAM NAME	SYMBOL	DEFINITION
TA	θA	θ-COORDINATE OF OFF-BODY POINT
TF	θF	θ-COORDINATE OF ON-BODY POINT
TTR1	$\theta tr1$	TEST ANGLE USED TO DETERMINE θtr
TTR2	$\theta tr2$	TEST ANGLE USED TO DETERMINE θtr
TTX1	$\theta tx1$	TEST ANGLE USED TO DETERMINE θtx
TTX2	$\theta tx2$	TEST ANGLE USED TO DETERMINE θtx
TT1	$\theta t1$	TEST ANGLE USED TO DETERMINE θt
TT2	$\theta t2$	TEST ANGLE USED TO DETERMINE θt
ZA	za	z-COORDINATE OF OFF-BODY POINT
ZD		INTERMEDIATE PARAMETER
ZF	zf	z-COORDINATE OF ON-BODY POINT

5.3.23 Name: VEHSET

DESCRIPTION

This subroutine computes basic parameters used in antenna-to-antenna and antenna-to-wire transfer models for aircraft and spacecraft. These parameters include body (cylinder) radius and core radius. For aircraft, the routine also computes the cylindrical coordinate angles to the wing tips and roots for use in the aircraft propagation model. It is called once at the beginning of the run.

DATA REQUIREMENTS

ARGUMENTS: None

COMMON BLOCKS:

ATAWRK, SYS2, XYZ, ISF, ERR

TABLE 109

VEHSET VARIABLES

PROGRAM NAME	DEFINITION
I	GENERAL INDEX
PI	3.141952653
TWRL	ANGLE TO LEFT WING ROOT (CYL COORDINATES)
TWT	ANGLE TO RIGHT WING TIP
TWTL	ANGLE TO LEFT WING TIP
WRWL1	HOLDING VARIABLE FOR WRWL

5.3.24 Name: GAIN

DESCRIPTION

Subroutine GAIN calculates antenna gains. For a dipole or monopole, the antenna gain in an arbitrary direction is calculated. For medium to high gain antennas, a three dimensional sector model is employed, the sector dimensions and gains having been given by the user. The gain in a specified direction is set equal to the appropriate sector gain.

DATA REQUIREMENTS

ARGUMENTS:

THO - vertical peak-of-beam angle (0-π)

PHO - horizontal peak-of-beam angle (0-2π)

TH - vertical look angle (0-π)

PH - horizontal look angle (0-2π)

S(I) - equal to APRM2(IANT, I) in ISF block

IS(I) - equal to IAPM2(IANT, I) in ISF block

IE - error code

TABLE 110

GAIN VARIABLES

PROGRAM NAME	SYMBOL	DEFINITION
APHI	ϕ_A	HORIZONTAL LOOK ANGLE IN COORDINATE SYSTEM OF ANTENNA
ATHETA	θ_A	VERTICAL LOOK ANGLE IN COORDINATE SYSTEM OF ANTENNA
CP		INTERMEDIATE VARIABLE
CPO		INTERMEDIATE VARIABLE
CT		INTERMEDIATE VARIABLE
CTO		INTERMEDIATE VARIABLE
DX		INTERMEDIATE VARIABLE
DY		INTERMEDIATE VARIABLE
DZ		INTERMEDIATE VARIABLE
EL	ℓ	ANTENNA LENGTH

TABLE 110 (Concluded)

PROGRAM NAME	SYMBOL	DEFINITION
GAIN		ANTENNA GAIN
GBL		BACK LOBE GAIN
GMB		MAIN BEAM GUN
GSL		SIDE LOBE GAIN
HBW		HORIZONTAL HALF-BEAMWIDTH
IPOL		POLARIZATION (1=HORIZONTAL, 2=VERTICAL)
NTYPE		ANTENNA TYPE
PI	π	CONSTANT EQUAL TO π
PIO2	$\pi/2$	CONSTANT EQUAL TO $\pi/2$
PI2	2π	CONSTANT EQUAL TO 2π
RADEG		RADIANS TO DEGREES CONVERSION FACTOR
SLW		SIDE LOBE HALF-WIDTH
SP		INTERMEDIATE VARIABLE
SPO		INTERMEDIATE VARIABLE
ST		INTERMEDIATE VARIABLE
STO		INTERMEDIATE VARIABLES
VBW		VERTICAL HALF-BEAMWIDTH
W		WIDTH OF SLOT ANTENNA
X		DIRECTION COSINE OF LOOK ANGLE IN X-DIRECTION IN ANTENNA COORDINATE SYSTEM
Y		DIRECTION COSINE OF LOOK ANGLE IN Y-DIRECTION IN ANTENNA COORDINATE SYSTEM
Z		DIRECTION COSINE OF LOOK ANGLE IN Z-DIRECTION IN ANTENNA COORDINATE SYSTEM
D	EL	ANTENNA DIAMETER

5.3.25 Name: GNDPRP

DESCRIPTION

Subroutine GNDPRP calculates the propagation loss between two antennas over a smooth earth. At low frequencies the surface wave model predominates, while a direct and reflected wave model predominates at the higher frequencies. No ionospheric contribution is included. For co-sited antennas, a near field model is used for the propagation loss.

DATA REQUIREMENTS

ARGUMENTS:

EL - propagation loss

DM - distance

H1 - height of first antenna

H2 - height of second antenna

D1 - diameter of first antenna

D2 - diameter of second antenna

FRQ - frequency

SIGMA - local ground conductivity

ER - local ground relative permittivity

TABLE 111

GNDPRP VARIABLES

PROGRAM NAME	SYMBOL	DEFINITION
DFSM		DISTANCE BEYOND WHICH THE FIELD MUST BE LESS THAN IN FREE SPACE
DMAX		MAXIMUM ANTENNA DIMENSION
DNF		NEAR FIELD BREAK POINT
ELNF		PROPAGATION LOSS AT NEAR FIELD BREAK POINT
F	f	FREQUENCY IN MHZ
HO	h_o	MINIMUM EFFECTIVE ANTENNA HEIGHT
H1EFF	h_1'	EFFECTIVE HEIGHT OF FIRST ANTENNA
H2EFF	h_2'	EFFECTIVE HEIGHT OF SECOND ANTENNA
PI	π	3.14159265
RAMDA	λ	WAVELENGTH
X		INTERMEDIATE VARIABLE

5.3.26 Name: FTW

DESCRIPTION

Subroutine FTW calculates the voltage induced in a wire segment due to an incident unit electric field. It is used by ACTFER in evaluating antenna-to-wire coupling and by ENVIRN in evaluating environmental field-to-wire coupling. Asymptotic approximations of the active transmission line solution are used.

DATA REQUIREMENTS

ARGUMENTS:

F - frequency of interest

ZL - combined impedance at "receptor" side of wire segment

ZO - combined impedance at other side of wire segment

B - separation between wire segment and its return or image

EL - wire segment length

R - wire radius

ISHCD - shield code (1=shielded, 2=unshielded, 3=double shielded)

VOLT - voltage induced in wire segment

COMMON BLOCKS: None

TABLE 112

FTW VARIABLES

PROGRAM NAME	DEFINITION
AMDA	WAVELENGTH
BOUND	UPPER BOUND ON INDUCED CURRENT
CUR	INDUCED CURRENT (NORMALIZED)
ISHLD	SHIELD CODE (SHIELDED, UNSHIELDED, DOUBLE SHIELDED)
PI	3.141592653
SE	SHIELDING EFFECTIVENESS
VOLT	INDUCED VOLTAGE (NORMALIZED)
X	NORMALIZED FREQUENCY
XM	FREQUENCY BREAK-POINT
Y	TEMPORARY EXPRESSION
ZC	CHARACTERISTIC IMPEDANCE OF TRANSMISSION LINE SEGMENT

5.3.27 Name: DCYL

DESCRIPTION

Cylindrical spiral length between two points given in cylindrical coordinates.

DATA REQUIREMENTS

ARGUMENTS:

R - radius of cylinder

T1, Z1 - rho and theta coordinates of first point

T2, Z2 - rho and theta coordinates of second point

COMMON BLOCKS: None

LOCAL VARIABLES: None

5.3.28 Name: DSL

DESCRIPTION

Straight line distance between two points given in cylindrical coordinates.

DATA REQUIREMENTS

ARGUMENTS:

R1, T1, Z1 - coordinates of first point

R2, T2, Z2 - coordinates of second point

COMMON BLOCKS: None

LOCAL VARIABLES: None

5.3.29 Name: CSH

DESCRIPTION

Cylindrical shading routine

DATA REQUIREMENTS

ARGUMENTS:

R - cylinder radius

T - angle around cylinder

F - frequency

DC - distance around cylinder

COMMON BLOCKS: None

TABLE 113

CSH VARIABLES

PROGRAM NAME	DEFINITION
A	INTERMEDIATE PARAMETER
CON	$.53237585 \times 10^{-9}$

5.3.30 Name: WTWTFR

DESCRIPTION

This routine calculates the ratio of the voltage produced on a receptor wire segment due to a voltage (and current) on an emitter wire segment in close proximity. This calculation includes components for capacitive coupling, inductive coupling, and common impedance coupling. It also accounts for the effects of shielding, twisting, grounding, balancing, pigtail loops, terminating impedances and wire branching. This ratio is calculated, and returned to the calling program, for each frequency in the equipment frequency table which lies within a specified range.

DATA REQUIREMENTS

ARGUMENTS:

IB - segment index

IWS - source wire index

IWR - receptor wire index

ISIDS - source side of source wire

ISIDR - load side receptor wire

TE - array of transfer ratios at emitter frequencies

TR - array of transfer ratios at receptor frequencies

COMMON BLOCKS:

PRTWRK, WIRE, ISF, IGUNIT, RCDI, ERR

TABLE 114

WTWTFR VARIABLES

PROGRAM NAME	DEFINITION
CC11	COUPLING CAPACITANCE - OPEN WIRE TO OPEN WIRE
CC12	COUPLING CAPACITANCE - OPEN WIRE TO SHIELDED WIRE
CC21	COUPLING CAPACITANCE - SHIELDED WIRE TO OPEN WIRE
CC22	COUPLING CAPACITANCE - SHIELDED WIRE TO SHIELDED WIRE
CESRES	COMPLEX EMITTER SHIELD RESISTANCE (SINGLE SHIELDED WIRE)
CL	OPEN WIRE EMITTER TO RECEPTOR COUPLING INDUCTANCE
CP1L	SEGMENT LENGTH FOR CALCULATION OF PRIMARY COUPLING INDUCTANCE
CP2L	SEGMENT LENGTH FOR CALCULATION OF SECONDARY COUPLING INDUCTANCE
CRSRES	COMPLEX RECEPTOR SHIELD RESISTANCE (SINGLE SHIELDED WIRE)
CRSRS1	COMPLEX RECEPTOR OUTER SHIELD RESISTANCE (DOUBLE SHIELDED WIRE)
CRSRS2	COMPLEX RECEPTOR INNER SHIELD RESISTANCE (DOUBLE SHIELDED WIRE)
CSRES1	COMPLEX EMITTER INNER SHIELD RESISTANCE (DOUBLE SHIELDED WIRE)
CSRES2	COMPLEX EMITTER OUTER SHIELD RESISTANCE (DOUBLE SHIELDED WIRE)
DT1L	SEGMENT LENGTH FOR CALCULATION OF SEGMENT SELF INDUCTANCE
DUCT1	SELF INDUCTANCE OF EMITTER WIRE SEGMENT
DUCT2	SELF INDUCTANCE OF RECEPTOR WIRE SEGMENT
EECAP	WIRE TO GROUND CAPACITANCE FOR EMITTER SEGMENT
EMINS	MINIMUM SEPARATION OF TWISTED PAIR EMITTER WIRES

TABLE 114 (Continued)

PROGRAM NAME	DEFINITION
EPCAP	WIRE-TO-WIRE CAPACITANCE FOR EMITTER TWISTED PAIR
EPSRE	RELATIVE PERMITTIVITY OF EMITTER INSULATION
EPSRR	RELATIVE PERMITTIVITY OF RECEPTOR INSULATION
ESFAC1	EMITTER SHIELD FACTOR FOR INNER SHIELD
ESFAC2	EMITTER SHIELD FACTOR FOR OUTER SHIELD
ESHRES	EMITTER SHIELD RESISTANCE (SINGLE SHIELDED WIRE)
ESRES1	EMITTER INNER SHIELD RESISTANCE (DOUBLE SHIELDED WIRE)
ESRES2	EMITTER OUTER SHIELD RESISTANCE (DOUBLE SHIELDED WIRE)
ESSCAP	EMITTER SHIELD-TO-SHIELD CAPACITANCE
EWSCAP	EMITTER WIRE-TO-SHIELD CAPACITANCE
F	FREQUENCY
FACT	INTERMEDIATE VARIABLE
H	SEGMENT HEIGHT ABOVE GROUND PLANE
IBAL	LOGIC FLOW VARIABLE FOR BALANCED EMITTER
IBALE	BALANCED/UNBALANCED CODE FOR EMITTER
IBALR	BALANCED/UNBALANCED CODE FOR RECEPTOR
IBALTP	LOGIC FLOW VARIABLE FOR BALANCED TWISTED RECEPTOR
ICEMIT	CODE FOR TYPE OF CAPACITIVE EMITTER
ICOMZ	CODE FOR COMMON IMPEDANCE
ICREP	CODE FOR TYPE OF CAPACITIVE RECEPTOR
IEENDS	NUMBER OF TERMINATIONS ON EMITTER SEGMENT
IF	FREQUENCY TABLE POINTER
IFREQ	NUMBER OF FREQUENCIES FOR WHICH TRANSFER RATIO CALCULATED

TABLE 114 (Continued)

PROGRAM NAME	DEFINITION
IF1	POINTER INDICATING LOWEST FREQUENCY TO BE USED
IF2	POINTER INDICATING HIGHEST FREQUENCY TO BE USED
ILEMIT	CODE FOR TYPE OF INDUCTIVE EMITTER
ILRECP	CODE FOR TYPE OF INDUCTIVE RECEPTOR
IMGMGE	CODE FOR TYPE OF EMITTER SHIELD GROUNDING
IMGMGR	CODE FOR TYPE OF RECEPTOR SHIELD GROUNDING
IRENDS	NUMBER OF TERMINATIONS ON RECEPTOR SEGMENT
ISCODE	EMITTER SHIELD CODE
ISCODR	RECEPTOR SHIELD CODE
ITUTE	EMITTER TWISTED/UNTWISTED CODE
ITUTR	RECEPTOR TWISTED/UNTWISTED CODE
IWIDE	EMITTER WIRE ID
IWIDR	RECEPTOR WIRE ID
I1	LOWER LIMIT FOR FREQUENCY POINTER
I2	LOWER LIMIT FOR FREQUENCY POINTER
J	INDEX OF DO LOOP
JTE1	EMITTER JACKET THICKNESS
JTR1	RECEPTOR JACKET THICKNESS
M	INDEX OF DO LOOP
N	INDEX OF DO LOOP
NTYPE	TYPE OF EMITTER SEGMENT
NTYPR	TYPE OF RECEPTOR SEGMENT

TABLE 114 (Continued)

PROGRAM NAME	DEFINITION
RC1	WIRE RADIUS FOR CALCULATION OF PRIMARY COUPLING CAPACITANCE
RC2	WIRE RADIUS FOR CALCULATION OF SECONDARY COUPLING CAPACITANCE
RECAP	WIRE TO GROUND CAPACITANCE FOR RECEPTOR SEGMENT
REINS	RECEPTOR WIRE INSULATION THICKNESS
RPCAP	WIRE-TO-WIRE CAPACITANCE FOR RECEPTOR TWISTED PAIR
RSDUCT	RECEPTOR SHIELD SELF-INDUCTANCE
RSFAC1	RECEPTOR SHIELD FACTOR FOR INNER SHIELD
RSFAC2	RECEPTOR SHIELD FACTOR FOR OUTER SHIELD
RSHRES	RECEPTOR SHIELD RESISTANCE (SINGLE SHIELDED WIRE)
RSRES1	RECEPTOR INNER SHIELD RESISTANCE (DOUBLE SHIELDED WIRE)
RSRES2	RECEPTOR OUTER SHIELD RESISTANCE (DOUBLE SHIELDED WIRE)
RSSCAP	RECEPTOR SHIELD TO SHIELD CAPACITANCE
RTE	RADIUS OF EMITTER WIRE INCLUDING INSULATION
RTPDCT	SELF-INDUCTANCE OF RECEPTOR TWISTED PAIR
RTR	RADIUS OF RECEPTOR WIRE INCLUDING INSULATION
RWSCAP	RECEPTOR WIRE-TO-SHIELD CAPACITANCE
RZRATC	COMPLEX IMPEDANCE RATIO
R1	RADIUS OF EMITTER WIRE

TABLE 114 (Continued)

PROGRAM NAME	DEFINITION
R1S	RADIUS OF INSIDE SHIELD OF EMITTER WIRE
R1SS	RADIUS OF OUTSIDE SHIELD OF EMITTER WIRE
R2	RADIUS OF RECEPTOR WIRE
R2S	RADIUS OF INSIDE SHIELD OF RECEPTOR WIRE
R2SS	RADIUS OF OUTSIDE SHIELD OF RECEPTOR WIRE
S	SEPARATION OF EMITTER WIRE AND RECEPTOR WIRE
SHDUCT	SELF INDUCTANCE OF SHIELD SEGMENT
SIGRE	RELATIVE CONDUCTIVITY OF EMITTER WIRE
SIGRR	RELATIVE CONDUCTIVITY OF RECEPTOR WIRE
SL	SEGMENT LENGTH
TPRDUC	SELF INDUCTANCE OF EMITTER TWISTED PAIR
T1	THICKNESS OF INSIDE EMITTER SHIELD
T1R	THICKNESS OF INSIDE RECEPTOR SHIELD
T2	THICKNESS OF OUTSIDE EMITTER SHIELD
T2R	THICKNESS OF OUTSIDE RECEPTOR SHIELD
WIRLE	LENGTH OF EMITTER SEGMENT
WIRLR	LENGTH OF RECEPTOR SEGMENT
X	ABSOLUTE VALUE OF VOLTAGE TRANSFER RATIO
XFERI	INDUCTIVE COMPONENT OF TRANSFER RATIO
XFERIC	COMMON IMPEDANCE COMPONENT OF TRANSFER RATIO
XFERI1	UNSHIELDED WIRE INDUCTIVE TRANSFER RATIO
XFERV	COMPONENT OF TRANSFER RATIO DUE TO CAPACITIVE COUPLING
XFERVF	PRIMARY COMPONENT OF CAPACITIVE TRANSFER RATIO

TABLE 114 (Concluded)

PROGRAM NAME	DEFINITION
XFERVS	SECONDARY COMPONENT OF CAPACITIVE TRANSFER RATIO
XFERV1	EMITTER FACTOR FOR CAPACITIVE TRANSFER RATIO FOR SHIELDED SEGMENT
XFERV2	EMITTER FACTOR FOR CAPACITIVE TRANSFER RATIO FOR UNSHIELDED SEGMENT
XFRV11	SHIELDED WIRE TO SHIELDED WIRE COMPONENT OF CAPACITIVE TRANSFER
XFRV12	SHIELDED WIRE TO UNSHIELDED WIRE COMPONENT OF CAPACITIVE TRANSFER
XFRV21	UNSHIELDED WIRE TO SHIELDED WIRE COMPONENT OF CAPACITIVE TRANSFER
XFRV22	UNSHIELDED WIRE TO UNSHIELDED WIRE COMPONENT OF CAPACITIVE TRANSFER
Y	ABSOLUTE VALUE OF CAPACITIVE TRANSFER RATIO
YFAR	TOTAL ADMITTANCE CONNECTED TO FAR END OF SEGMENT
YNEAR	TOTAL ADMITTANCE CONNECTED TO NEAR END OF SEGMENT
Z1R	TOTAL IMPEDANCE ON SOURCE END OF RECEPTOR SEGMENT
Z2	TOTAL IMPEDANCE ON RECEIVER END OF EMITTER SEGMENT
Z2R	TOTAL IMPEDANCE ON RECEIVER END OF RECEPTOR SEGMENT

5.3.31 Subroutine Name: SHFAC

DESCRIPTION

Function which computes shielding factor for shields.

DATA REQUIREMENTS

ARGUMENTS:

T - shield thickness

SIGR - conductivity relative to copper

F - frequency

COMMON BLOCKS:

None

TABLE 115

SHFAC VARIABLES

PROGRAM NAME	DEFINITION
DEL	SHIELD SKIN DEPTH
PI	3.14159
SHFAC	SHIELDING FACTOR
SIGC	5.8×10^{-7}

5.3.32 Name: DCRES

DESCRIPTION

Function which computes the d-c shield resistance.

DATA REQUIREMENTS

ARGUMENTS:

SL - segment length

R - shield radius

T - shield thickness

SIGR - conductivity relative to copper

COMMON BLOCKS:

None

LOCAL VARIABLES:

None

5.3.33 Name: ACOSH

DESCRIPTION

Function to compute hyperbolic cosine.

DATA REQUIREMENTS

ARGUMENTS:

x - argument

COMMON BLOCKS:

None

LOCAL VARIABLES:

None

5.3.34 Name: CUPIND

DESCRIPTION

Function to compute the coupling inductance between wire segments.

DATA REQUIREMENTS

ARGUMENTS:

H1 - height of segment number 2

H2 - height of segment number 2

S - separation of segments

COMMON BLOCKS:

None

TABLE 116

CUPIND VARIABLES

PROGRAM NAME	DEFINITION
SH1H2	SUM OF SEGMENT HEIGHTS
DH1H2	DIFFERENCE OF SEGMENT HEIGHTS

5.3.35 Name: WSIND

DESCRIPTION

Function which computes inductance of wire segment.

DATA REQUIREMENTS

ARGUMENTS:

H - height above ground plane

R - radius of wire

COMMON BLOCKS:

None

LOCAL VARIABLES:

None

5.3.36 Name: SHRES

DESCRIPTION

Function which computes resistance of a shield.

DATA REQUIREMENTS

ARGUMENTS:

SL - segment length

R - radius of shield

T - thickness of shield

SIGR - conductivity relative to copper

F - frequency

COMMON BLOCKS:

None

TABLE 117

SHRES VARIABLES

PROGRAM NAME	DEFINITION
ARG	INTERMEDIATE VARIABLE
DEL	SHIELD SKIN DEPTH
DEM	DENOMINATOR FOR RESISTANCE CALCULATION
EMX	INTERMEDIATE VARIABLE
EPX	INTERMEDIATE VARIABLE
XMUL	MULTIPLIER FOR RESISTANCE CALCULATION
XNUM	NUMERATOR FOR RESISTANCE CALCULATION

5.3.37 Name: WSCAP

DESCRIPTION

Function which computes wire-to-shield capacitance.

DATA REQUIREMENTS

ARGUMENTS:

R1 - shield inner radius

R2 - shield outer radius

EPSR - relative permittivity

COMMON BLOCKS:

None

TABLE 118

WSCAP VARIABLES

PROGRAM NAME	DEFINITION
DEM	DENOMINATOR FOR CAPACITANCE CALCULATION
XNUM	NUMERATOR FOR CAPACITANCE CALCULATION

5.3.38 Name: CUPCAP

DESCRIPTION

Function which computes the coupling capacitance between wire segments.

DATA REQUIREMENTS

ARGUMENTS:

R1 - radius of wire number 1

R2 - radius of wire number 2

S - separation of wire segments

H - height of segments above ground

COMMON BLOCKS:

None

TABLE 119

CUPCAP VARIABLES

PROGRAM NAME	DEFINITION
D	SQUARE ROOT OF SUM H2 SQUARED PLUS SS
DD	D SQUARED
DET	DETERMINANT OF P11, P22, AND P12
H2	TWICE SEGMENT HEIGHT
P11	HYPERBOLIC COSINE OF H/R1
P12	FRACTION OF DIFFERENCE OF P12A AND P12B
P12A	SUM OF HYPERBOLICS INVOLVING SS AND R12
P12B	SUM OF HYPERBOLICS INVOLVING DD AND R12
P22	HYPERBOLIC COSINE OF H/R2
R12	DIFFERENCE IN SQUARE OF WIRE RADIUSES
SS	SQUARE OF SEGMENT SEPARATION

5.3.39 Name: CMPLXO

DESCRIPTION

Function which computes value of complex parameter.

DATA REQUIREMENTS

ARGUMENTS:

Z - impedance

F - frequency

DUCT - inductance

COMMON BLOCKS:

None

LOCAL VARIABLES:

None

5.3.40 Name: CMPLX1

DESCRIPTION

Function which computes value of complex parameter.

DATA REQUIREMENTS

ARGUMENTS:

Z1 - impedance

Z2 - impedance

F - frequency

DUCT - inductance

COMMON BLOCKS:

None

LOCAL VARIABLES:

None

5.3.41 Name: CMPLX2

DESCRIPTION

Function which computes value of complex parameter.

DATA REQUIREMENTS

ARGUMENTS:

C - capacitance

Z - impedance

F - frequency

COMMON BLOCKS:

None

LOCAL VARIABLES:

None

5.3.42 Name: CMPLX3

DESCRIPTION

Function which computes value of complex parameter.

DATA REQUIREMENTS

ARGUMENTS:

F - frequency

DUCT - inductance

COMMON BLOCKS:

None

LOCAL VARIABLES:

None

5.3.43 Name: CUPDUC

DESCRIPTION

Function which computes inductive coupling between circuits.

DATA REQUIREMENTS

ARGUMENTS:

D - separation of twisted wires

S - separation between emitter wire and receptor wire

COMMON BLOCKS:

None

LOCAL VARIABLES:

None

5.3.44 Name: CAPEND

DESCRIPTION

Function which computes value of end capacitance for twisted pair segment.

DATA REQUIREMENTS

ARGUMENTS:

H - height above ground

R - radius of wire

COMMON BLOCKS:

None

LOCAL VARIABLES:

None

5.3.45 Name: IWTP

DESCRIPTION

Subroutine which sets codes for segment wire type.

DATA REQUIREMENTS

ARGUMENTS:

IWTYPE - wire segment type

IWID - wire ID

IB - bundle ID

ICWT - capacitive type for segment

ILWT - inductive type for segment

IBTP - balanced/unbalanced code

IMG - type of shield grounding

COMMON BLOCKS:

WIRE

LOCAL VARIABLES:

None

5.3.46 Name: NTYP

DESCRIPTION

Function which sets wire type code.

DATA REQUIREMENTS

ARGUMENTS:

ISHCOD - type of shield

ITUT - twisted/untwisted code

JBAL - balanced/unbalanced code

COMMON BLOCKS:

None

LOCAL VARIABLES:

None

5.3.47 Name: CTCTFR

DESCRIPTION

Calculates the electromagnetic coupling between equipment cases.

DATA REQUIREMENTS

ARGUMENTS:

None

COMMON BLOCKS:

ISFE, ISFR, PRTWRK

TABLE 120

CTCTFR VARIABLES

PROGRAM NAME	DEFINITION
RDB	TEMPORARY VALUE OF TRANSFER FUNCTION
R2	SQUARE OF CASE-TO-CASE SEPARATION IN METERS
X	X-COMPONENT OF CASE-TO-CASE SEPARATION
Y	Y-COMPONENT OF CASE-TO-CASE SEPARATION
Z	Z-COMPONENT OF CASE-TO-CASE SEPARATION

5.3.48 Name: FILTER

DESCRIPTION

Subroutine FILTER calculates the transfer function of a filter connected to a port termination at frequencies provided as a calling argument. Band pass or tuned filter characteristics are provided from a filter file, and tuned filters are assumed to be tuned for worst case.

DATA REQUIREMENTS

ARGUMENTS:

FREQ - frequency table

I1 - lower frequency pointer

I2 - upper frequency pointer

TRNSF - transfer function table

IERR - error code

IRT - receptor/transmitter switch

IPORT - port index

COMMON BLOCKS:

IOUNIT, ISFE, ISFR and FILTER

TABLE 121

FILTER VARIABLES

PROGRAM NAME	SYMBOL	DEFINITION
D		TEMPORARY EXPRESSION
DD		TEMPORARY EXPRESSION
EM	m	COUPLING COEFFICIENT
EYESOL		FILTER ISOLATION
F	f	FREQUENCY
FC		BREAK POINT OF HIGH PASS OR LOW PASS FILTER
FL		LOWER LIMIT OF FREQUENCY PASS OR REJECT BAND
FREQ1		DEFINES LOWER LIMIT OF FREQUENCY INTERVAL
FREQ2		DEFINES UPPER LIMIT OF FREQUENCY INTERVAL

TABLE 121 (Concluded)

PROGRAM NAME	SYMBOL	DEFINITION
FU		UPPER LIMIT OF FREQUENCY PASS OR REJECT BAND
FO		TUNED FREQUENCY
GAIN		FILTER GAIN AT PARTICULAR FREQUENCY
GAM	γ	FILTER INSERTION LOSS
I		COUNTING INDEX
IPORT		INDEX OF PORT TO WHICH FILTER IS CONNECTED
QQ		TEMPORARY EXPRESSION
T		TEMPORARY EXPRESSION
TUNHI		HIGHEST TUNED FREQUENCY
TUNLOW		LOWEST TUNED FREQUENCY
T1		TEMPORARY EXPRESSION
X		NORMALIZED FREQUENCY
EQUIVALENCED VARIABLES:		
B	P(2)	PFLT(2) IN COMMON BLOCK FILTER
EM	P(6)	PFLT(6) IN COMMON BLOCK FILTER
EYESOL	P(4)	PFLT(6) IN COMMON BLOCK FILTER
FC	P(1)	PFLT(1) IN COMMON BLOCK FILTER
FL	P(1)	PFLT(1) IN COMMON BLOCK FILTER
FU	P(2)	PFLT(2) IN COMMON BLOCK FILTER
GAM	P(3)	PFLT(3) IN COMMON BLOCK FILTER
ITYPE	IP(2)	IFLT(2) IN COMMON BLOCK FILTER
NSTAGE	IP(3)	IFLT(3) IN COMMON BLOCK FILTER
Q	P(5)	PFLT(5) IN COMMON BLOCK FILTER

5.3.49 Name: ENVIRN

DESCRIPTION

Subroutine ENVIRN evaluates the contribution of the internal and external electromagnetic field toward the total received signal at a receptor port. For an antenna port, the external field is assumed to be incident normal to the antenna aperture, while for the equipment case, the internal field level is used. A wire port is assumed to be subject to the worst case external field orientation over aperture exposed segments, and to worst case internal field orientation over non-aperture exposed segments, and the contributions from all wire segments are totalled.

DATA REQUIREMENTS

ARGUMENTS:

None

COMMON BLOCKS:

IOUNIT, PRTWRK, SYS2, ISF, RCDI, WIRE, ISFR, FILTER, ATAWRK

TABLE 122

ENVIRN VARIABLES

PROGRAM NAME	DEFINITION
AREA	EFFECTIVE AREA OF ANTENNA APERTURE
AREA1	PHYSICAL AREA OF ANTENNA APERTURE
AREA2	EFFECTIVE AREA OF ISOTROPIC ANTENNA
CITM	INCHES TO METERS CONVERSION FACTOR
ESQRD	SQUARE OF ELECTRIC FIELD MAGNITUDE
EXLNTH	EXPOSED LENGTH OF A WIRE SEGMENT
EXTFLD	EXTERNAL FIELD TABLE INTERPOLATED AT RECEPTOR FREQUENCIES
F	FREQUENCY
FREQ1	DEFINES LOWER LIMIT OF FREQUENCY INTERVAL
FREQ2	DEFINES UPPER LIMIT OF FREQUENCY INTERVAL
I	COUNTING INDEX
IAP	APERTURE INDEX
IB	WIRE SEGMENT INDEX

TABLE 122 (Concluded)

PROGRAM NAME	DEFINITION
IDANTR	RECEPTOR ANTENNA ID
IDFLTR	RECEPTOR FILTER ID
IFQ	COUNTING INDEX
IFTR	FILTER INDEX
INTFLD	INTERNAL FIELD TABLE INTERPOLATED AT RECEPTOR FREQUENCIES
IPATH1	REDEFINED PATH CODE FOR ENVIRONMENTAL FIELD COUPLING
ISHLD	WIRE SHIELD CORE (SHIELDED, UNSHIELDED OR DOUBLE SHIELDED)
IW	WIRE INDEX
IWRTYP	RECEPTOR WIRE TYPE
JW	COMPLEX FREQUENCY
PI	PI
SEP	WIRE SEPARATION
SGLNTH	LENGTH OF A WIRE SEGMENT
TWOPIJ	CONSTANT EQUAL TO $2\pi j$
VOLT	VOLTAGE INDUCED BY UNIT FIELD
WRAD	WIRE RADIUS
YFAR	ADMITTANCE AT FAR END OF RECEPTOR WIRE SEGMENT
YNEAR	ADMITTANCE AT NEAR END OF RECEPTOR WIRE SEGMENT
YY	MAGNITUDE SQUARED OF ADMITTANCE
ZL	IMPEDANCE AT NEAR END OF RECEPTOR WIRE SEGMENT
ZO	IMPEDANCE AT FAR END OF RECEPTOR WIRE SEGMENT

5.3.50 Name: INTERP

DESCRIPTION

Performs a log-linear interpolation of a spectrum.

DATA REQUIREMENTS

ARGUMENTS:

F1 - lower frequency

F2 - upper frequency

S - table of spectrum to be interpolated

GLEV - interpolated output level

COMMON BLOCKS:

PRTWRK

TABLE 123

INTERP VARIABLES

PROGRAM NAME	DEFINITION
IFLAG	FLAG (WHEN EQUAL TO 1, INDICATES THAT THE PREVIOUS TEST FREQUENCY WAS LESS THAN F1)
ITEST	INDEX OF FTEST
FA	PREVIOUS TEST FREQUENCY
FTEST	TEST FREQUENCY FROM TABLE
GA	PREVIOUS TEST LEVEL
GTEST	TEST LEVEL FROM TABLE
G2	TEMPORARY LEVEL

5.3.51 Name: SIDE

DESCRIPTION

Determines which end of a wire segment connects to a source or receptor port for every segment of a wire.

DATA REQUIREMENTS

ARGUMENTS:

IPORT - index of the port

IW - wire index

ISIDE - table of side codes (1 or 2) for each segment of the wire

COMMON BLOCKS:

WIRE

TABLE 124

SIDE VARIABLES

PROGRAM NAME	DEFINITION
I	COUNTING INDEX
IY	COUNTING INDEX
J	UNPACKED INDEX OF A PORT CONNECTED TO ONE SIDE OF A WIRE SEGMENT

5.3.52 Name: LOAD

DESCRIPTION

Calculates the load admittance tied on to each side of a wire segment.

DATA REQUIREMENTS

ARGUMENTS:

IW - wire index

IB - segment index

ISIDE - side of segment to which a port connects (1 or 2)

F - frequency

YNEAR - admittance at near side of port

YFAR - admittance at far side of port

COMMON BLOCKS:

WIRE, RCDI

TABLE 125

LOAD VARIABLES

PROGRAM NAME	DEFINITION
I	UNPACKED INDEX OF A PORT TERMINATION
IY	COUNTING INDEX
JW	COMPLEX FREQUENCY ($2\pi jF$)
YTEMP	TEMPORARY VARIABLE

5.3.53 Name: WRAPUP

DESCRIPTION

This routine is the control routine for calling the routines that read the work files after TART and write the Intrasystem Signature File.

DATA REQUIREMENTS

ARGUMENTS:

None

COMMON BLOCKS:

STIX, ICUNIT, IOUWK, FLAG

LOCAL VARIABLES:

None

5.3.54 Name: WFREAD

DESCRIPTION

This routine reads the binary working files. Which files are read depends upon the calling argument.

DATA REQUIREMENTS

ARGUMENTS:

IMAP - control variable signalling which "read" is requested

= 1, read equipment data from emitter work file

= 2, read equipment data from receptor work file

= 3, read both emitter and receptor work files

= 4, read bundle work files

= 5, read spectrum work files

COMMON BLOCKS:

FLAG, TITLE, SPECT, ERR, IOUNIT, REINIT, INDX, IOUWK, STIX, ISF

TABLE 126

WFREAD VARIABLES

PROGRAM NAME	DEFINITION
I	INDEX
IB	INDEX
IEND	INDEX
IEND2	TERMINAL INDEX OF A VARIABLE NUMBER PARAMETER ARRAY
IEQR	EQUIPMENT NUMBER FROM RECEPTOR WORK FILE
IEQS	EQUIPMENT NUMBER FROM SOURCE WORK FILE
IP	PORT INDEX
IREAD	SIGNALS WHICH FILE IS TO BE READ: = 1, SO EQPT WORK FILE; = 2, RC; = 3, BOTH

TABLE 126 (Concluded)

PROGRAM NAME	DEFINITION
IS	INITIAL INDEX OF A VARIABLE NUMBER PARAMETER ARRAY
ISR	SO/RC TYPE CODE
ITIM	DO LOOP INDEX
ITO	LOGICAL UNIT FOR READING WORK FILE
ITYP	PORT TYPE CODE
IW	WIRE INDEX
J	INDEX
K	INDEX
MODSIG	MODULATION/SIGNAL CODE
NP	NUMBER OF PORTS
NPR	NUMBER OF PORTS ON RECEPTOR FILE
NPS	NUMBER OF PORTS ON SOURCE FILE
NR	NUMBER OF HARMONICS
NSP	NUMBER OF SUBPARAMETERS
NSP1	NUMBER OF SUBPARAMETERS IN THE FIRST SUBPARAMETER GROUP
NTIM	NUMBER OF PASSES NEEDED TO DO READS OF EQPT WORK FILES = 1 IF ONLY SO OR RC BEING READ; = 2 IF BOTH
NWIR2	NUMBER OF WIRES PER BUNDLE
NWS	NUMBER OF WIRE SEGMENTS
NWS2	NUMBER OF WIRE SEGMENTS TIMES 2 GIVING THE NUMBER OF ENTRIES IN BEP2 ARRAY
NWS41	NUMBER OF WIRE SEGMENTS TIMES 4 PLUS 1 GIVING THE NUMBER OF ENTRIES IN IBEP2 ARRAY

5.3.55 Name: ASPNT

DESCRIPTION

Prints finally adjusted spectra during wrapup.

DATA REQUIREMENTS

ARGUMENTS:

None

COMMON BLOCKS:

IOUNIT, ISF, INDX, SPECT

TABLE 127

ASPNT VARIABLES

PROGRAM NAME	DEFINITION
I	GENERAL INDEX
IDCD	DECODED ID ARRAY
IDEQPT	EQPT DECODED ID
IDPT	PORT DECODED ID
IDSUB	SUBSYSTEM DECODED ID
IFQ	FREQUENCY INDEX
I1	DO LOOP LOWER RANGE INDEX
I2	DO LOOP UPPER RANGE INDEX
LINES	LINES PRINTED
LP	LINES PER PAGE LIMIT

5.3.56 Name: ALPH

DESCRIPTION

Unpacks and decodes ID's of five coded characters per word to arrays of one alpha character per word.

DATA REQUIREMENTS

ARGUMENTS:

IPCK - packed word array

IALPH - unpacked arrays

NWDS - no. of words in IPCK

COMMON BLOCKS:

None

TABLE 128

ALPH VARIABLES

PROGRAM NAME	DEFINITION
ICH	CHARACTER INDEX
ICHAR	ARRAY OF CHARACTER
ICHR	DECODED CHARACTER
IDOT	"+"
IEND	LAST CHARACTER INDEX IN IALPH
IWD	WORD INDEX
I1	WORD CURRENTLY BEING UNPACKED
I2	INTERMEDIATE VARIABLE
J	LOOPING INDEX
JCH	CHARACTER INDEX IN IALPH

5.3.57 Name: ISFRIT

This subroutine writes out a new Incrasystem Signature File and is identical to the program under the same name described in IDIPR section 5.1.21.

5.3.58 Name: FTSRCH

This subroutine is in IDIPR. See section 5.1.19.

5.4 COMMON BLOCKS IN THE TASK ANALYSIS ROUTINE

This section describes those labelled common blocks in TART which are not used in IDIPR, avoiding needless repetition of long cables. The following labelled common blocks are described:

TABLE 129. ATAWRK

TABLE 133. EMCASC

TABLE 134. EMBSLN

TABLE 135. FILTER

TABLE 136. IOUWK

TABLE 137. IOUSCF

TABLE 138. ISFE

TABLE 139. ISFR

TABLE 140. PRTWRK

TABLE 142. WIRE

For a description of the remaining labelled common blocks in TART (CEARV, ERR, FLAG, IOUNIT, ISF, RCDI, SYS2, TITLE and XYZ), refer to Tables 61-88 in Section 5.2.2.

TABLE 129

COMMON BLOCK ATAWRK VARIABLES

PROGRAM NAME	SYMBOL	DEFINITION
APLEN		APERTURE LENGTH
APWID		APERTURE WIDTH
DC		DISTANCE AROUND CYLINDER OF PROP PATH (NO WING SHADING)
DC1		DISTANCE AROUND CYLINDER OF PATH FROM XMTR ANT TO WING POINT
DC2		DISTANCE AROUND CYLINDER OF PATH FROM WING POINT TO RCPT ANT
DMIN		LENGTH OF MINIMUM PATH BETWEEN TWO ANTENNAS OR POINTS

TABLE 129 (Continued)

PROGRAM NAME	SYMBOL	DEFINITION
DWR		PATH LENGTH FROM XMTR ANTENNA TO WING POINT
DXW		PATH LENGTH FROM WING POINT TO RCPT ANTENNA
FREQ		FREQUENCY OF EMTR FOR PATH LOSS CALCULATION
IAPR		APERTURE INDEX
IRO		ANTENNA - FUSELAGE CODE, WING TO RCVR ANTENNA (SEE TABLE 132)
IROX		ANTENNA - FUSELAGE CODE, XMTR ANTENNA TO WING (SEE TABLE 132)
IRSIDE		INDEX INDICATING SIDE OF WIRE SEGMENT CONTAINING RECEPTOR LOAD
IRTRN		WIRE RETURN CODE (1=GROUND OR SHIELD, 2=WIRE RETURN)
ISH		SHADING/PATH AROUND VEHICLE CODE (SEE TABLE 130)
ISHW		WING EDGE CODE (SEE TABLE 131)
ISR		IAPM2 ARRAY PARAMETERS FOR ANTENNA USED BY RCPT (SEE TABLE 43)
ISX		IAPM2 ARRAY PARAMETERS FOR ANTENNA USED BY EMTR (SEE TABLE 43)
IWR		RCPT WIRE INDEX
IWSH		CYLMDL PATH CODE (-1=WING TO RCPT, 0=NO WING, +1=XMTR TO WING)
LWAP		APERTURE WING LOCATION CODE (SEE TABLE 42)
LWAR		RCPT ANTENNA WING LOCATION CODE (SAME CODING AS LWAP)
LWAX		XMTR ANTENNA WING LOCATION CODE (SAME CODING AS LWAP)
RHOAP	ρ_{ap}	ρ - COORDINATE OF APERTURE
RHOR	ρ_r	ρ - COORDINATE OF RCPT ANTENNA
RHOW	ρ_w	ρ - COORDINATE OF WING POINT

TABLE 129 (Continued)

PROGRAM NAME	SYMBOL	DEFINITION
RHOX	ρ_x	ρ - COORDINATE OF XMTR ANT POINT
SFC		CYLINDRICAL SHADING FACTOR (dB)
SFW		WING SHADING FACTOR (dB)
SR		APRM2 PARAMETERS FOR ANT USED BY RCPT
SX		APRM2 PARAMETERS FOR ANT USED BY XMTR
THAP	Θ_{ap}	Θ - COORDINATE OF APERTURE
TR	Θ_R	Θ - COORDINATE OF RCPT ANTENNA
TS	Θ_s	ANGLE AROUND CYLINDER
TS1	Θ_{s1}	Θ_s FOR XMTR TO WING
TS2	Θ_{s2}	Θ_s FOR WING TO RCPT
TT	Θ_T	Θ - COORDINATE OF TANGENT POINT (ONE ANTENNA ONLY OFF BODY)
TTR	Θ_{TR}	Θ - COORDINATE OF TANGENT POINT OF BODY-TO-RCPT SEGMENT OF PATH
TTX	Θ_{TX}	Θ - COORDINATE OF TANGENT POINT OF XMTR-TO-BODY SEGMENT
TW	Θ_W	Θ - COORDINATE OF WING POINT
TWR	Θ_{WR}	Θ - COORDINATE OF WING ROOT
TW1	Θ_{W1}	WING SECTOR ANGLE(COUNTERCLOCKWISE)
TW2	Θ_{W2}	WING SECTOR ANGLE
TW3	Θ_{W3}	WING SECTOR ANGLE
TW4	Θ_{W4}	WING SECTOR ANGLE
TX	Θ_X	Θ - COORDINATE OF XMTR ANTENNA
XAP	X_{ap}	X - COORDINATE OF APERTURE
XR	X_r	X - COORDINATE OF RCPT ANTENNA
XW	X_w	X - COORDINATE OF WING POINT
XX	X_x	X - COORDINATE OF XMTR ANTENNA
YAP	Y_{ap}	Y - COORDINATE OF APERTURE

TABLE 129 (Concluded)

PROGRAM NAME	SYMBOL	DEFINITION
YR	Y_r	Y - COORDINATE OF RCPT ANTENNA
YW	y_w	Y - COORDINATE OF WING POINT
YX	y_x	Y - COORDINATE OF XMTR ANTENNA
ZAP	y_{ap}	Y - COORDINATE OF APERTURE
ZR	z_r	Z - COORDINATE OF RCPT ANTENNA
ZT	z_t	Z - COORDINATE OF TANGENT POINT (ONE ANTENNA OFF BODY)
ZTR	z_{tr}	Z - COORDINATE OF BODY-TO-RCPT ANTENNA TANGENT POINT
ZTX	z_{tx}	Z - COORDINATE OF XMTR-TO-BODY TANGENT POINT
ZW	z_w	Z - COORDINATE OF WING POINT
ZX	z_x	Z - COORDINATE OF XMTR ANTENNA

TABLE 130

SHADING/PATH AROUND VEHICLE CODE (ISH)

ISH	MEANING
1	TOP OF FUSELAGE ONLY
2	BOTTOM OF FUSELAGE ONLY
3	OVER RIGHT WING ONLY
4	OVER LEFT WING ONLY
5	FUSELAGE TO RIGHT WING
6	FUSELAGE TO LEFT WING
7	FUSELAGE TO RIGHT WING TO FUSELAGE
8	FUSELAGE TO LEFT WING TO FUSELAGE
9	FREE SPACE
10	WING SHADING CONSIDERED BUT REJECTED BECAUSE PATH NOT INTERSECT WING

TABLE 131

WING EDGE CODE (ISHW)

ISHW	MEANING
0	NOT AROUND WING
1	FWD EDGE
2	AFT EDGE

TABLE 132

ANTENNA - FUSELAGE CODE, XMTR ANT TO WING (IROX) AND
ANTENNA - FUSELAGE CODE, WING TO RCVR ANT (IRO)

FIRST DIGIT (RELATION TO BODY)				
	IROX[2]		IRO[2]	
VALUE	TRANSMITTER ANTENNA	WING POINT	WING POINT (XMTR IF NO WING SHADING)	RECEIVER ANTENNA
1	ON	ON	ON	ON
2	ON	OFF	ON	OFF
3	OFF	ON	OFF	ON
4	OFF	OFF	OFF	OFF
BLANK	(SEE NOTE 1)		(SEE NOTE 1)	

SECOND DIGIT (CURVE)	
VALUE	CURVE USED
0	STRAIGHT LINE ONLY
1	STRAIGHT LINE AND CYLINDRICAL SPIRAL
2	CYLINDRICAL SPIRAL ONLY
3	CONICAL SPIRAL ONLY

NOTES:

1. BLANK IF ANTENNAS HAVE SAME θ COORDINATES OR FREE SPACE
2. IF NO WING SHADING, IROX IS ZERO AND IRO CODE APPLIES FOR TRANSMITTER ANTENNA TO RECEIVER ANTENNA

TABLE 133

COMMON BLOCK EMCASC VARIABLES

PROGRAM NAME	DEFINITION
ALE	ADJUSTMENT LIMIT FOR EMTR
ALR	ADJUSTMENT LIMIT FOR RCPT
ADJS	EMTR SPECTRUM ADJUSTMENT AMOUNT
BWFSE	BANDWIDTH FACTOR AT EMTR FREQS
BWFSR	BANDWIDTH FACTOR AT RCPT FREQS
EMINP	INTEGRATED EMI MARGIN FOR PORT PAIR
EMINT	INTEGRATED EMI MARGIN FOR TOTAL SIGNAL
EMMX	MAXIMUM EMI MARGIN FOR PORT PAIR
EMS	EMI MARGIN OF RCPT TO TOTAL SIGNAL
EMSE	EMI MARGIN AT EMTR FREQS
EMSR	EMI MARGIN AT RCPT FREQS
RSIGR	RECEIVED SIGNAL LEVEL AT RCPT FREQS
RSIGS	RECEIVED SIGNAL AT EMTR FREQS
SPEI	EMTR SPECTRUM AMPLITUDES INTERPOLATED AT RCPT FREQS
SPRI	RCPT SPECTRUM AMPLITUDES INTERPOLATED AT EMTR FREQS

TABLE 134

COMMON BLOCK EMBSLN VARIABLES

PROGRAM NAME	DEFINITION
EMINPB	INTEGRATED EMI MARGIN FOR PORT PAIR IN BASELINE SYSTEM
EMINTB	INTEGRATED EMI MARGIN FOR TOTAL SIGNAL IN BASELINE SYSTEM
EMSB	EMI MARGIN TO TOTAL SIGNAL IN BASELINE SYSTEM
EMSEB	EMI MARGIN AT EMTR FREQS IN BASELINE SYSTEM
EMSRB	EMI MARGIN AT RCPT FREQS IN BASELINE SYSTEM
RSIGTB	TOTAL RECEIVED SIGNAL IN BASELINE SYSTEM
TRNSEB	TRANSFER RATIO AT EMTR FREQS IN BASELINE SYSTEM
TRNSRB	TRANSFER RATIO AT RCPT FREQS IN BASELINE SYSTEM

TABLE 135

COMMON BLOCK FILTER VARIABLES

PROGRAM NAME	DEFINITION
IFILT(I)	EQUAL TO IFLT2 (IFTR,I) FOR FILTER (SEE TABLE 44)
PFLT(I)	EQUAL TO FPRM2 (IFTR,I) FOR FILTER (SEE TABLE 44)

TABLE 136

COMMON BLOCK IOUWK VARIABLES

TART PROGRAM NAME	IDIPR EQUIVALENT	DEFINITION
IEEDF	IT12	LOGICAL UNIT INDEX OF EMTR EQPT DATA FILE
IREDF	IT13	LOGICAL UNIT INDEX OF RCPT EQUPT DATA FILE
IUESF	IT10	LOGICAL UNIT INDEX OF UNADJUSTED EMTR SPECTRUM FILE
IURSF	IT11	LOGICAL UNIT INDEX OF UNADJUSTED RCPT SPECTRUM FILE
IWBF	IT14	LOGICAL UNIT INDEX OF WIRE BUNDLE FILE

TABLE 137

COMMON BLOCK IOUSCF VARIABLES

PROGRAM NAME	DEFINITION
IAESF	LOGICAL UNIT INDEX OF ADJUSTED EMTR SPECTRUM FILE
IARSF	LOGICAL UNIT INDEX OF ADJUSTED RCPT SPECTRUM FILE
ISCHTR	LOGICAL UNIT INDEX OF SCRATCH TRANSFER FILE
ITRNF	LOGICAL UNIT INDEX OF BASELINE TRANSFER FILE
IWMF	LOGICAL UNIT INDEX OF WIRE MAP FILE

TABLE 138

COMMON BLOCK ISFE VARIABLES

PROGRAM NAME	DEFINITION
EPRME	EQUIPMENT FLOATING POINT ARRAY FOR EMITTER BEING ANALYZED (SEE TABLE 46)
IEPRME	EQUIPMENT INTEGER ARRAY FOR EMITTER (SEE TABLE 46)
IPPRME	PORT INTEGER ARRAY FOR EMITTER (SEE TABLE 47)
ISOE	SOURCE INTEGER ARRAY FOR EMITTER (SEE TABLES 48-51)
PPARME	PORT FLOATING POINT ARRAY FOR EMITTER (SEE TABLE 47)
SRCE	SOURCE FLOATING POINT ARRAY FOR EMITTER (SEE TABLES 48-51)

TABLE 139

COMMON BLOCK ISFR VARIABLES

PROGRAM NAME	DEFINITION
EPRMR	EQUIPMENT FLOATING POINT ARRAY FOR RECEPTOR BEING ANALYZED (SEE TABLE 46)
IEPRMR	EQUIPMENT INTEGER ARRAY FOR RECEPTOR (SEE TABLE 46)
IPPRMR	PORT INTEGER ARRAY FOR RECEPTOR (SEE TABLE 47)
IROR	RECEPTOR INTEGER ARRAY FOR RECEPTOR (SEE TABLES 48-51)
PPARMR	PORT FLOATING POINT ARRAY FOR RECEPTOR (SEE TABLE 47)
RPRM	RECEPTOR FLOATING PORT ARRAY FOR RECEPTOR (SEE TABLES 48-51)

TABLE 140

COMMON BLOCK PRTWRK VARIABLES

PROGRAM NAME	DEFINITION
BWCE	CHANNEL BANDWIDTH OF EMTR (HZ)
BWCR	CHANNEL BANDWIDTH OF RCPT (HZ)
EIDE	EMTR UNPACKED EQPT ID
EIDR	RCPT UNPACKED EQPT ID
FQTDBE	EMTR FREQ TABLE IN DB
FQTDBR	RCPT FREQ TABLE IN DB
FQTE	EMTR FREQ TABLE
FQTR	RCPT FREQ TABLE
IANTE	EMTR PACKED ANTENNA ID
IANTR	RCPT PACKED ANTENNA ID
IBDLE	EMTR PACKED BUNDLE ID
IBDLR	RCPT PACKED BUNDLE ID
ICHE	EMTR CHANGE CODE FROM IDIPR
ICHGE	EMTR CEAR CHANGE CATEGORY CODE
ICHR	RCPT CHANGE CODE FROM IDIPR
ICHGR	RCPT CEAR CHANGE CATEGORY CODE
ICONE	EMTR PORT CONNECTION CODE (SEE TABLE 47)
ICONR	RCPT PORT CONNECTION CODE (SEE TABLE 47)
IEQE	EMTR EQPT INDEX
IEQR	RCPT EQPT INDEX
IF1CE	INDEX OF LOWEST COMMON FREQ IN EMTR TABLE FOR PORT PAIR
IF1CR	INDEX OF LOWEST COMMON FREQ IN RCPT TABLE FOR PORT PAIR
IF1E	INDEX OF LOWEST TABLE FREQ USED BY EMTR PORT

TABLE 140 (Continued)

PROGRAM NAME	DEFINITION
IF1R	INDEX OF LOWEST TABLE FREQ USED BY RCPT PORT
IF2CE	INDEX OF HIGHEST COMMON FREQ IN EMTR TABLE FOR PORT PAIR
IF2CR	INDEX OF HIGHEST COMMON FREQ IN RCPT TABLE FOR PORT PAIR
IF2E	INDEX OF HIGHEST TABLE FREQ USED BY EMTR PORT
IF2R	INDEX OF HIGHEST TABLE FREQ USED BY RCPT PORT
INOUTE	SO/RC TYPE CODE FOR EMTR (SEE TABLE 48)
INOUTR	SO/RC TYPE CODE FOR RCPT (SEE TABLE 48)
INRCP	=0 IF INITIAL CALL TO COUPLE FOR RCPT PORT, ELSE NOT 0
IPATH	COUPLING PATH CODE (SEE TABLE 142)
IPORTE	CUMULATIVE PORT INDEX OF EMTR
IPORTR	CUMULATIVE PORT INDEX OF RCPT
IPRTE	EMTR PORT INDEX RELATIVE TO EQUIPMENT
IPRTR	RCPT PORT INDEX RELATIVE TO EQUIPMENT
IPVE	EMTR PACKED SUBSYSTEM, EQPT, AND PORT ID'S
IPVR	RCPT PACKED SUBSYSTEM, EQPT, AND PORT ID'S
IREFE	EMTR WIRE REFERENCE CODE (SEE TABLE 47)
IREFR	RCPT WIRE REFERENCE CODE (SEE TABLE 47)
ISRE	EMTR SR CODE (SEE TABLES 48-51)
ISRR	RCPT SR CODE (SEE TABLES 48-51)
IWIDR	RCPT PACKED WIRE ID
IWIDS	EMTR PACKED WIRE ID
NBNDLE	NUMBER OF WIRE BUNDLES
NCE1	NUMBER OF COUPLED EMITTERS INTO PERCENT RCPT
NFQE	NUMBER OF FREQS IN EMTR TABLE

TABLE 140 (Concluded)

PROGRAM NAME	DEFINITION
NFQR	NUMBER OF FREQS IN RCPT TABLE
NPRTE	NUMBER OF PORTS IN EMTR EQPT
NPRTR	NUMBER OF PORTS IN RCPT EQPT
PIDE	EMTR UNPACKED PORT ID
PIDR	RCPT UNPACKED PORT ID
RFR1E	EMTR LOWER REQUIRED RANGE FREQ
RFR1R	RCPT LOWER REQUIRED RANGE FREQ
RFR2E	EMTR UPPER REQUIRED RANGE FREQ
RFR2R	RCPT UPPER REQUIRED RANGE FREQ
RSIGT	TOTAL RECEIVED SIGNAL ARRAY
SBIDE	EMTR UNPACKED SUBSYSTEM ID
SBIDR	RCPT UNPACKED SUBSYSTEM ID
SPE	EMTR SPECTRUM ARRAY
SPELIM	EMTR SPECTRUM ADJUSTMENT LIMIT ARRAY
SPR	RCPT SUSCP SPECTRUM ARRAY
SPRLIM	RCPT SPECTRUM ADJUSTMENT LIMIT ARRAY
TRNSFE	TRANSFER RATIO ARRAY (DB) AT EMTR TABLE FREQS
TRNSFR	TRANSFER RATIO ARRAY (DB) AT RCPT TABLE FREQS

TABLE 141

COUPLING PATH CODE (IPATH)

IPATH	COUPLING MODE
1	Antenna to Antenna
2	Antenna to Wire
3	Wire to Wire
4	Case to Case
5	Environmental Field to Antenna
6	Environmental Field to Wire
7	Environmental Field to Case

TABLE 142

COMMON BLOCK WIRE

PROGRAM NAME	DEFINITION
AVGSEP	AVERAGE SEPARATION BETWEEN TWO WIRES IN THE BUNDLE
IDAP(J)	APERTURE ID ASSOCIATED WITH J-TH BUNDLE SEGMENT
IEND1(I,J,K)	CODED LISTS OF PORTS CONNECTED TO "LEFT" AND "RIGHT" SIDE OF J-TH SEGMENT, I-TH WIRE
IS1(I,J)	MAXIMUM GROUNDS ON LEFT SIDE OF JTH SEGMENT, I-TH WIRE
IS2(I,J)	MAXIMUM GROUNDS ON RIGHT SIDE OF J-TH SEGMENT, I-TH WIRE
IWID(I)	WIRE ID OF I-TH WIRE
IWTYPE(I)	WIRE TYPE OF I-TH WIRE
NBSEG	NUMBER OF BUNDLE SEGMENTS
NFLAG(I,J)	NUMBER OF END POINTS ASSOCIATED WITH J-TH SEGMENT, I-TH WIRE
NWIRES	NUMBER OF WIRES IN THE BUNDLE
SEGHT(J)	HEIGHT ABOVE GROUND PLANE OF J-TH SEGMENT
SEGLTH(J)	LENGTH OF J-TH SEGMENT
WIRL(I)	LENGTH OF I-TH WIRE

5.5 PROGRAM CONSTANTS

A list of constants used in IDIPR and TART routines, with relevant information, is provided in Table 143. These constants are usually mathematical conversion factors, such as the ratio of common logarithm to natural logarithm or geometric constants such as "pi", or the frequently used products of constants used in the various mathematical models.

TABLE 143

IEMCAP VARIABLES

PROGRAM NAME	DEFINITION	VALUE
CEAR	CONVERSION FROM NATURAL LOGARITHM TO TEN TIMES BASE TEN LOGARITHM	4.342944819
RCPTRD	SAME AS ABOVE	4.343
BWFCTR	ASSUMED PERCENT BANDWIDTH FOR FREQUENCY LESS THAN 50 KHz	30%
BWFCTR	ASSUMED PERCENT BANDWIDTH FOR FREQUENCY BETWEEN 50 KHz and 1 MHz	10%
BWFCTR	ASSUMED PERCENT BANDWIDTH FOR FREQUENCY BETWEEN 1 MHz AND 10 MHz	7%
BWFCTR	ASSUMED PERCENT BANDWIDTH FOR FREQUENCY BETWEEN 10 MHz AND 1[illegible] [illegible]Hz	5%
BWFCTR	ASSUMED PERCENT BANDWIDTH FOR FREQUENCY BETWEEN 100 MHz AND 1 GHz	2.5%
BWFCTR	ASSUMED PERCENT BANDWIDTH FOR FREQUENCY GREATER THAN 1 GHz	1%
BWFCTR	CONVERSION FROM NATURAL LOGARITHM TO TEN TIMES BASE TEN LOGARITHM	4.343
BWFCTR	CONVERSION FACTOR CHANGING dB/Hz to dB/MHz	-60
TCRS	CONVERSION FROM NATURAL LOGARITHM TO TEN TIMES BAS[illegible] TEN LOGARITHM	4.343
EMINTS	CONVERSION FACTOR CHANGING dB/MHz to dB/Hz	+60
PEMPNT	CONVERSION FROM THE NATURAL LOGARITHM TO TEN TIMES THE BASE TEN LOGARITHM	4.343
TEMPNT	CONVERSION FROM THE NATURAL LOGARITHM TO TEN TIMES THE BASE TEN LOGARITHM	4.343

TABLE 143 (Continued)

SYMBOL	PROGRAM NAME	FUNCTION	DEFINITION	VALUE
PI	WTWTFR	SHRES	π	3.14159
SIGC	WTWTFR	SHRES		5.8×10^7
PI	ACTFER		π	3.14159?653
PI2	ACTFER		2π	6.28319
CITM	ACTFER		CONVERSION FACTOR FROM INCHES TO METERS	.0254
DEGRAD	ACTFER		CONVERSION FACTOR FROM DEGREES TO RADIANS	.017453291
	ACTFER		CITM/2	.0127
	ACTFER		CONVERSION FACTOR FROM NATURAL LOGARITHM TO TWENTY TIMES BASE TEN LOGARITHM	8.686
	ACTFER		$20 \log_{10} (3 \times 10^{10}/4\pi(2.54))$	179.46
	ACTFER		$10 \log_{10} (376.7/4\pi(.0254)^2)$	46.6711
	ACTFER		CONVERSION FACTOR FROM NATURAL LOGARITHM TO TEN TIMES BASE TEN LOGARITHM	4.343
PI	AIRCFT		π	3.1415926
PI32	AIRCFT		$3\pi/2$	4.7123889
PI2	AIRCFT		2π	6.2831853
PIOV2	AIRCFT		$\pi/2$	1.5707963
PI	WINGSH		π	3.14159
PI2	WINGSH		2π	6.2831853
	WINGSH		CONVERSION FACTOR FROM NATURAL LOGARITHM TO TWENTY TIMES BASE TEN LOGARITHM	8.6859
PI	CYLMDL		π	3.1415926
PI2	CYLMDL		2π	6.2831853

TABLE 14[illegible] (Continued)

SYMBOL	PROGRAM NAME	FUNCTION	DEFINITION	VALUE
CON	CYLMDL	CSH	CONVERSION FACTOR	$.53237585 \times 10^{-9}$
PI	ACTFER	GAIN	π	3.14159265
PI2	ACTFER	GAIN	2π	6.28319
PIO2	ACTFER	GAIN	$\pi/2$	1.5708
RADEG	ACTFER	GAIN	CONVERSION FACTOR FROM RADIANS TO DEGREES	57.2958
PI	GNDPRP		π	3.14159265
	GNDPRP		CONVERSION FROM Hz to MHz	10^{-6}
	GNDPRP		SPEED OF LIGHT DIVIDED BY 10^6	299.793
	GNDPRP		$20 \text{ LOG}_{10} (299.793/4\pi)$	27.55
	GNDPRP		$20 \text{ LOG}_{10} (299.793/4\pi) + 6$	33.55
PI	FTW		π	3.14159
	LOAD		TWO TIMES PI	6.28319
	CTCTFR		CONVERSION OF INCHES TO METERS	.0254
	CW		CONVERSION FROM $\text{dB}(\text{V})^2$ TO $\text{dB}(\mu\text{V})^2$	120
	PULSE		CONVERSION FROM $\text{dB}(\text{V}^2)/\text{Hz}$ TO $\text{dB}(\mu\text{V})^2/\text{MHz}$	180
	PULSE		CONVERSION FROM $\text{dB}(\text{V}^2)$ TO $\text{dB}(\mu\text{V})^2$	120
	RADAR		CONVERSION FROM dBV^2/Hz TO $\text{dB}(\mu\text{V})^2/\text{MHz}$	180
	RADAR		$2.3548/2\sqrt{\pi}$	.66428
	RADAR		$10 \text{ LOG}_{10} (2\pi/(2.3548)^2)$	.54
	ANLOG		CONVERSION FROM $\text{dB}(\text{V}^2)/\text{Hz}$ TO $\text{dB}(\mu\text{V})^2/\text{MHz}$	180
	SIGCON		CONVERSION FACTOR FROM $\text{dB V}^2/\text{Hz}$ TO $\text{dB}(\mu\text{V})^2/\text{MHz}$	180

TABLE 143 (Continued)

SYMBOL	PROGRAM NAME	FUNCTION	DEFINITION	VALUE
TEMPNT			CONVERSION FROM NATURAL LOGARITHM TO TWENTY TIMES BASE TEN LOGARITHM	8.686
TWOPIJ	COUPLE		$2\pi j$	j6.283185
	WTWTFR		CONVERSION FROM MILS TO METERS	2.54×10^{-5}
	WTWTFR		3 INCHES EXPRESSED IN METERS	.0762
	WTWTFR		FACTOR USED IN COMMON IMPEDANCE COUPLING	10^{-5}
PI	WTWTFR	CAPEND	π	3.14159
EPS	WTWTFR	CAPEND	PERMITTIVITY OF FREE SPACE	8.85E-12
PI	WTWTFR	CMPLXO	π	3.14159
PI	WTWTFR	CMPLX3	π	3.14159
PI	WTWTFR	CMPLX1	π	3.14159
	WTWTFR	CUPDUC	PERMEABILITY OF FREE SPACE DIVIDED BY 4π	10^{-7}
PI	WTWTFR	CMPLX2	π	3.14159
PI	WTWTFR	CUPCAP	π	3.14159
EPS	WTWTFR	CUPCAP	PERMITTIVITY OF FREE SPACE	8.854×10^{-12}
PI	WTWTFR	WSCAP	π	3.14159
EPS	WTWTFR	WSCAP	PERMITTIVITY OF FREE SPACE	8.854×10^{-12}
PI	WTWTFR	SHFAC	π	3.14159
SIGC	WTWTFR	SHFAC	CONDUCTIVITY OF COPPER	5.8×10^{7}
PI2	WTWTFR	DCRES	2π	6.28318
SIGC	WTWTFR	DCRES	CONDUCTIVITY O[illegible]OPPER	5.8×10^{7}
	WTWTFR	CUPIND	PERMEABILITY OF FREE SPACE DIVIDED BY 4π	10^{-7}
	WTWTFR	WSIND	PERMEABILITY OF FREE SPACE DIVIDED BY 2π	2×10^{-7}

TABLE 143 (Concluded)

SYMBOL	PROGRAM NAME	FUNCTION	DEFINITION	VALUE
	SIGCON		CONVERSION FACTOR FROM dB V^2 TO $dB(\mu V)^2$	120
	SIGCON		CONVERSION FACTOR FROM dB V^2 TO $dB(\mu V)^2$	120
	M461		CONVERSION FACTOR FROM dB V^2 TO $dB(\mu V)^2$	120
	M461		HARMONIC-SPURIOUS EMISSION LIMIT FOR 0 dBW-PEAK OUTPUT	68.666
	M461		ALLOWED HARMONIC-SPURIOUS EMISSION LIMIT AT 40 dBW-PEAK OUTPUT ADJUSTED TO 0 dBW-PEAK OUTPUT	12.666
	M461		SLOPE USED IN HARMONIC-SPURIOUS EMISSION LIMIT	.4333
	M461		CONVERSION OF NATURAL LOGARITHM TO TWENTY TIMES BASE TEN LOGARITHM	8.686
	EEDMDL		CONVERSION OF $dB(I^2)$ TO $dB(\mu I)^2$	120
	M704		CONVERSION OF $dB(V^2)$ TO $dB(\mu V)^2$	120
	M704		CONVERSION OF 26 dB BELOW THE CONVERSION OF $dB(V^2)$ TO $dB(\mu V)^2$	94

Section 6

USER INPUT AND DATA FILES

IEMCAP uses two types of input data, card input and data file input. Card input refers to the user-defined data whether it is in physical card form or a file entered through a remote terminal. The data files refer to the internal files generated by IEMCAP. Card input is used to initially define the system to be analyzed, to update the system, and to provide control parameters. The IDIPR and TART programs can analyze large quantities of data by utilizing a number of internal files that contain information which cannot all be simultaneously stored in core. Additionally, the files are used to allow separate running of IDIPR and TART as well as to save data and analysis results for further use.

6.1 IDIPR CARD INPUT

6.1.1 Input Card Format

The basic format for all input cards is a free-field format with parameters given in a positional order separated by commas. There are no card column specifications and all blanks are ignored. This basic format is as follows:

$$\text{KEYWORD (MODISF)} = \text{ID}, p_1, p_2, p_3, \overset{p_4}{(sp_1, sp_2 \ldots)}, p_5, \overset{p_6}{(sp_1, \ldots)} \ldots$$

KEYWORD - denotes nature of the data card

MODISF - indicates modification to Intrasystem File, ISF. (optional)

ID - Alphanumeric identifier.

p_1 - parameters, fixed number depending on keyword.

sp_1 - subparameters, variable number depending on previous parameter.

A list of keywords is given in Table 59. Following the keyword in parentheses is an optional Intrasystem File modification code word for all data except control cards.

The term subparameter group refers to a variable number of parameters enclosed in "( )". Each subparameter group, such as p_4 and p_6, is counted as one parameter so that the number of parameters is fixed for each keyword and this number will be checked by the error analysis routine. An input example is given in Figure 6 to illustrate the input structure and input types.

INPUT CARDS

```
             REMARK= FILE ID=CCOT4M CORRECTED BASELINE SYSTEM.  REVISED 9-4-73
CONTROL      EXEC=GEAR,NEW,SURVEY
             OU=NO
             SYSTEM=AIR,0,0,0,-06,-100.
SYSTEM       WNGRT=55,12,225,456
             WGTTP=230,16,435,493
             FUSLGE=165.,56.5,13.8,25.,12.,FLAT
ENVIRON-     EFQ= 1E3,100E3,1E6,100E6,1E9,4E9
MENTAL       OF=30,30,40,40,30,30
FIELD        IE=-20,-20,5,5,-20,-20
APERTURE     APER=NSFWH ,0,0,86,35,50,NOW
             APER=TOPCP,0,77.2,332.5,30,10,NOW
             ANT=COMTA,DIPOLE,VE,(.20)
             ANT=CMADF,LOOP,H7,(.25)
ANTENNA      ANT=TPSP,DIPOLE,VE,(.08)
             ANT=PODHP,HORN,H7,(.10,7.5,30,30,-5,90,-20)
             ANT=PDOMN,DIPOLE,VE,(.05)
             ANT=ALTM,HORN,H7,(.05,7.5,25,60,-4,110,-30)
             FILTER=FLTR1,SGTUN,1,(300.E6,1.E3,-1,-80)
             FILTER=FLTR2,TRCOUP,1,(300.E6,-1,-80,200,.1)
             FILTER=FLTR3,BUTTER,5,(1.075E9,.1E6,-1,-80)
FILTERS      FILTER=FLTR4,LOWPAS,4,(1.5E9,-1,-80)
             FILTER=FLTR5,HIPAS,4,(.95E6,-1,-80)
             FILTER=FLTR6,BPASS,6,(.95E6,4.05E6,-1,-80)
             FILTER=FLTR7,BRJCT,10,(4.01E6,8.E6,-1,-80)
WIRE         WRTBL=SPC??,UN,1,30,1,6,2.8
             WRTBL=SPCS2,SH,1,30,1,6,2.8,42,8,6.6,463
TABLE        WRTBL=SPCCC,DS,1,30,1,6,2.8,42,8,5.6,463,7,6.7
             SUBSYS=CNI
               EQPT=UHFCO,M461,ADJUST,AFCTP,NONE,21.5,23,180
             COMMENT=UHF COMM
               FREQ=30,18.E9,1,35
               PORT=CASE,6,0
EQUIPMENT         SOURCE=CASE, 30,MILSPC,SP(100.,27.5,100.E3,27.5,25.E6,52.5,100.E6,
CASE         25,            1.E9,-25.6)
                  RCEPT=CASE,10.,MILSPC,MILSPC
               PORT=COMLO,ANT,(COMTA,0,0,0,0,86,NOW),50,0,0,0,0      ,FLTR2
PORT COMLO        SOURCE=RF, 30.,225E6,399.9E6,100.,50.E3,AM(VOICE,5.E3,1),(-50,-100)
                  RCEPT=RF, 30.,225E6,399.9E6,-100 ,50.E3,AM(VOICE,5.E3,0),1.E6
               PORT=COMUP,ANT,(COMTA,0,0,0,138,625,NOW),50,0,0,0,0   ,FLTR1
                  SOURCE=RF, 30.,225E6,399.9E6,100.,50.E3,AM(VOICE,5.E3,1),(-50,-100)
                  RCEPT=RF, 30.,225E6,399.9E6,-100,50.E3,AM(VOICE,5.E3,0),1.E6
               PORT=ADFIN,ANT,(CMADF ,0,0,0,0,129,NOW),50,0,0,0,0             ,0
                  RCEPT=RF, 30.,225E6,399.9E6,-100,50.E3,AM(VOICE,5.E3,0),1.E6
               PORT=PWRSP,WIRE,(W??1,W1W1,A1,GND,NONE,FX),.5,0,0,0,0          ,0
                  SOURCE=POWER,30,115,400,2,1,M461A
                  RCEPT=POWER,30,115,400,2,1,M461A
               PORT=A??,WIRE,(??DL2,?H2,A2,GND,NONE,NOTEX),50,0,0,0,0   ,0
                  SOURCE=SIGNAL,30,20.E?,4.E6,RECTPL( 20.E3,1.E-6),10,VLTS,4.E6
               PORT=PYCON,WIRE,(???,?B2W1,A2,GND,GND,FX),50,0,0,0,0,0
                  SOURCE=SIGNAL,30,??,5.?,RECTPL(1.E3,.2E-3),10,VLTS,4.E6
                  RCEPT=SIGNAL,30,20.E?,2,5.??,RECTPL(1.E3,.2E-3),10,VLTS,4.E6
             COMMENT=TACAN
               EQPT=TACAN,M61810,ADJUST,CNIBY,NOT.-3,15,175
                FREQ=30,18.E9,1,35
                FQTBL=800.E6,962.E6,1025E6,1130.E6,1213.E6,1280.E6,1380E6
                PORT=CASE,0,0
                  SOURCE=CASE,30,MILSPC,MILSPC
                  RCEPT=CASE, 30,MILSPC,MILSPC
                PORT=TACRF,ANT,(COMTA,0,0,0,80,374,NOW),50,0,0,0,0    ,FLTR3
                  SOURCE=RF, 30,1025.E6,1130E6,1500,572E ,RADAR(RECTPL,30,2.5E-6),(-50,-80)
```

FIGURE 6
EXAMPLE OF INPUT STRUCTURE
(Part 1 of 3)

```
    RCEPT=RF,30,962E6,1213E6,-100,500E3,RADAR(RECTPL,30,2.5E-6),100E6
   PORT=POWER,WIRE,(BNDL1,B1W2,B1,GND,GND,NOTEX),.5,0,0,0,0      ,0
     SOURCE= POWER,30,115,400,0,3,M461A
     RCEPT= POWER,30,115,400,0,3,M461A
 EQPT=IFF,M461,ADJUST,CNIRY,NOT,5,7,175
  FREQ=30,18.E9,1,35
  FQTBL=1030.E6,1090E6
   PORT=CASE,0,0
     SOURCE=CASE,30,MIL,MIL
     RCEPT=CASE,30,MIL,MIL
   PORT=IFFRF,ANT,(TRSP,0,0,0,80,224,NOW),50,0,0,0,0     ,FLTR4
     SOURCE=RF,30,1090E6,1090E6,1000,5E6,RADAR,(TPZD,2200,.45E-5,
           .1E-6,.1E-6),(-60,-90)
     RCEPT=RF,30,1030E6,1030E6,-70,7E6,RADAR(TPZD,2200,.45E-5,.1E-5,
          .1E-6),0
   PORT=POWER,WIRE,(BNDL1,B1W2,C1,GND,NONE,NOTEX),.5,0,0,0,0      ,0
     SOURCE=POWER,30,115,400,3,3,M461A
     RCEPT= POWER,30,115,400,0,3,M461A
SUBSYS=TMGPD
COMMENT=IN-BOARD PYLON
  EQPT=INPYL,M461A,ADJUST,STA8,NON ,81.5,-20,300
   FREQ=30,18.E9,1,35
   FQTBL=1E6,4E6,5E6
   PORT=CASE,0,0
     SOURCE=CASE,30,MILSPC,MILSPC
     RCEPT= CASE,30,MILSPC,MILSPC
   PORT=IPFX,ANT,(PODHR,100,0,81.5,-20,210,ROT),73,0,0,0,0,FLTR5
     SOURCE=RF,30,1E6,4E6,15000,3E6,SPECT(-.5E6,-18.2,0.,71.8,
          .5E6,-18.2),(-60.,-90.)
   PORT=IPAX,ANT,(PODHR,100,130,81.5,-20,340,ROT),73,0,0,0,0,FLTR5
     SOURCE=RF,30,1E6,4E6,15000,3E6,SPECT(-.5E6,-18.2,0.,71.8,
          .5E6,-18.2),(-60.,-90.)
    PORT=IPOP,ANT,(PODMN,0,0,81.5,-20,270,ROT),100,0,0,0,0      ,0
      RCEPT=RF,30,1E6,4E6,-90,3E6,SPECT(-.5E6,-18.2,
            0,71.8,.5E6,-18.2),0
   PORT=EEDIN,WIRE,(BNDL2,B2W1,P2,GND,GS,EX),1,0,0,0,0          ,0
     RCEPT=EED,30,1,1,(30,1,0, 1.E10,1,1)
   PORT=AIDIN,WIRE,(BNDL2,B2W2,P2,GND,GND,NOTEX),100E3,0,0,0,0,0
     RCEPT=SIGNAL,30,1E3,5.E6,RECTPL(20.E3,1.E-6),10,VLTS,4.E6
   PORT=PWRSP,WIRE,(BNDL1,B1W1,C1,GND,NONE,EX),.5,0,0,0,0       ,0
     SOURCE=POWER,30,115,400,2,1,M461A
     RCEPT=POWER,30,115,400,2,1,M461A
COMMENT=OUTBOARD PYLON
  EQPT=OBPYL,M461A,ADJUST STA9,NON .134.5,-20,350
   FREQ=30,18.E9,1,35
   FQTBL=1E6,4E6,5E6
   PORT=CASE,0,0
     SOURCE=CASE,30,MILSPC,MILSPC
     RCEPT= CASE,30,MILSPC,MILSPC
   PORT=OBFX,ANT,(PODHR,100,0,134.5,-20,300,ROT),73,0,0,0,0,FLTR6
     SOURCE=RF,30,1E6,4E6,15000,3E6,SPECT(-.5E6,-18.2,0.,71.8,
          .5E6,-18.2),(-60.,-90.)
   PORT=OBAX,ANT,(PODHR,100,180,134.5,-20,370,ROT),73,0,0,0,0,FLTR6
     SOURCE=RF,30,1E6,4E6,15000,3E6,SPECT(-.5E6,-18.2,0.,71.8,
          .5E6,-18.2),(-60.,-90.)
    PORT=OBOP,ANT,(PODMN,0,0,134.5,-20,340,ROT),100,0,0,0,0     ,0
      RCEPT=RF,30,1E6,4E6,-90,3E6,SPECT( .5E6,-18.2,
            0,71.8,.5E6,-18.2),0
COMMENT=CENTER LINE STATION
  EQPT=CENTL,M461A,ADJUST,STA5,NON ,0,-20,320
   FREQ=30,18.E9,1,35
   FQTBL=1E6,4E6,5E6
   PORT=CASE,0,0
     SOURCE=CASE,30,MILSPC,MILSPC
```

FIGURE 6 (Continued)
EXAMPLE OF INPUT STRUCTURE
(Part 2 of 3)

```
    RCEPT= CASE,30,MILSPC,MILSPC
  PORT=CLFX,ANT,(PODHP,100,0,0,-20,280,NOW),73,0,0,0,0 ,FLTR7
    SOURCE=RF,30,1E6,4E6,15000,3E6,SPECT(-.5E6,-18.2,0.,71.8,
         .5E6,-18.2),(-60.,-80.)
  PORT=CLAX,ANT,(PODHP,100,180,0,-20,350,NOW),73,0,0,0,0,FLTR7
    SOURCE=RF,30,1E6,4E6,15000,3E6,SPECT(-.5E6,-18.2,0.,71.8,
         .5E6,-18.2),(-60.,-80.)
   PORT=IPOP,ANT,(PDOMN,0,0,0,-20,310,NOW),100,0,0,0,0          ,0
     RCEPT=RF,30,1E6,4E6,-90,3E6,SPECT(-.5E6,-18.2,
          0,71.8,.5E6,-18.2),0
SUBSYS=RDALT
  EQPT=RTUNT,M461,ADJUST,CNIBY,NOT,0,9,175
   FREQ=30,18E9,1,35
   FQTBL=4200E6,4300E6,4400E6
    PORT=CASE,0,0
      SOURCE=CASE,30,MIL,MIL
      RCEPT=CASE,30,MIL,MIL
    PORT=RFOUT,ANT,(ALTM,0,180,42,0,212,NOW),50,0,0,0,0            ,0
      SOURCE=RF,30,4200E6,4400E6,100,8E6,RADAR(TPZD,10F3,.1E-6,.01E-6,
            .01E-6),(-40,-40,-40)
    PORT=RFIN,ANT,(ALTM,0,180,-42,0,212,NOW),50,0,0,0             ,0,0
      RCEPT=RF,30,4200E6,4300E6,-90,60E6,RADAR(TPZD,10F3,.1E-6,.01E-6,
           .01E-6),0
SUBSYS=DISP
  EQPT=DISP,M461,ADJUST,AFTCP,NOT,21.5,18,180
   FREQ=30,18.E9,1,35
    PORT=CASE,0,0
      SOURCE=CASE,30,MIL,MIL
      RCEPT=CASE,30,MIL,MIL
   PORT=DSPIN,WIRE,(BNDL2,B2W2,D2,GND,GND,FX),50,0,0,0,0,0
     RCEPT=SIGNAL,30,1E3,5.E5,RECTPL(20.E3,1.E-6),10,VLTS,4.E6
BU=BNDL1
  BPTS=A1,5,65,100,B1,0,80.,370.4,C1,-5,90,400
    BSEG=A1,B1,270.9,4,COMP1,TOPCP,
     B1,C1,      32.0,4,COMP1,0
      WIRE=B1W1,SPC22,A1,B1,C1
      WIRE=B1W2,SPCS2,B1,C1
BUNDLE=BNDL2
  BPTS=A2,0,75,115,B2,-81.5,-20,270,C2,5,90,400,D2,21.5,18,180
    BSEG=A2,C2,119.2,4,COMP1,NSEWH,
     B2,C2,191.0,4,COMP2,0,
     D2,C2,220,4,COMP1,0
      WIRE=B2W1,SPCCC,A2,C2,32
      WIRE=B2W2,SPCS2,B2,C2,D2,A2
EODATA
```

FIGURE 6 (Concluded)
EXAMPLE OF INPUT STRUCTURE
(Part 3 of 3)

There are three types of specifications for any parameter: a user-supplied alphanumeric component identification (ID), a pre-defined alphanumeric code word, or a numerical value. This specification will depend on the card format and other parameters of the card. A list of card formats is given in Tables 144 - 148. The list of alpha codes by keyword is given in Table 60. These alpha codes can be given by the two letter abbreviations shown in the table. The program searches the list for the valid alpha code words for the keyword and assigns to it the numeric value given in Table 60. The user supplied numeric identification is composed of up to 5 letters and digits, the first being alpha. The number of parameters and subparameters given is checked by appropriate type and the card is flagged as an error if the number is in error. The User's Manual gives more detailed input specifications.

6.1.2. Data Hierarchies

There are two hierarchies associated with the input card format. The first hierarchy is subsystem, equipment, port, source/receptor, in that order.

```
SUBSYSTEM = "Subsystem ID"
  EQUIPMENT = "Equipment ID", ...
     PORT = "Port ID", ...
        SOURCE = "S/R CODE", ...
        RECEPTOR = "S/R CODE", ...
     PORT = "PORT ID", ...
        RECEPTOR = "S/R CODE", ...
```

All the port input cards representing ports of a particular equipment follow the equipment and subsystem input cards. Each port may be a receptor or source or both, and source and receptor input cards follow the port input card in either order.

The second hierarchy is bundle, bundle points, bundle segments, wire:

BUNDLE = "Bundle ID"

  BPTS = "Point ID", X_1, Y_1, Z_1, ...

     BSEG = "Point ID", "Point ID", ...

        WIRE = "Wire ID", ...

        WIRE = "Wire ID", ...

        WIRE = "Wire ID", ...

The bundle identifying card must be first, followed by the bundle points input card, bundle segments input card, and wire input cards in any order.

A description of the specific input card formats including control cards is given in Tables 144-148. For a more detailed description refer to the IEMCAP User's Manual.

6.1.3 IDIPR Data Input Rules

1. The format of all cards (except end-of-data) must have a keyword, an optional ISF modify code, and an equals sign, followed by the parameters associated with the keyword. There are no column specifications. Parameters can be continued onto following cards by specifying the last non-blank column of the card to be continued as ", ".

2. Only those keywords specified in the Input Data Section will be recognized.

3. All parameters denoted as alpha code have a list of valid options to be selected by the user. Only these options will be recognized. (These are given in Table 60.)

4. All keywords and alpha code words can be abbreviated by the first two letters or given in full.

5. All parameters denoted as alpha are user-supplied alphanumeric identifications (ID). The following conventions apply to ID's:

   a. An ID is composed of 1 to 5 alphabetic letters and digits. (More than 5 results in a syntax error.) Blanks are eliminated and the characters compressed.

   b. The first character of the ID must be alphabetic.

   c. No special characters may be used in an ID.

   d. In general, the ID should be unique for that keyword type. Some exceptions to this are permitted. For example, only port ID's within an equipment need to be unique, and each new equipment must have the first port ID specified as CASE.

6. Parameters and subparameter groups are separated by commas.

7. The exact number of parameters associated with a keyword must be given, except for control cards (EXEC, LIST, OUTPUT) and in those instances where alternate ways are given in the Input Data. If a parameter is not applicable, a placeholder, such as 0, must be given to show the omission. This holds even if the parameter is the last one, as the number of parameters is checked for each card, and it is flagged as an error if the correct number of parameters is not given.

On control cards, the position of a parameter must be preserved with placeholders, but if parameters at the end are not used, they may be omitted. For example, on an EXEC card, EXEC = ISP, NEW is sufficient. If, however, CE (cancel error stop) is desired, the third parameter must be given to keep the position of CE; i.e., EXEC = ISP, NEW, ISF, CE.

8. Parameters enclosed in parenthesis are called subparameters. The number of these is variable or fixed, depending upon the particular use. If the number is fixed, the exact number must be given. For example, on the SOURCE = CNTRL card, MODSIG determines the subparameter specifications. If MODSIG is PDM, there is one and only one subparameter, r_b; if MODSIG is equal to SPECT, there is a variable number of subparameters (up to 10 frequencies and 10 gains).

9. All parameters not specified as alpha or alpha code should have user supplied numeric values given. The following conventions are used for numerical values:

a. Either integer values or floating point values can be given (10 or 10.).

b. Floating point numbers may be expressed in exponential form; such as .nE±s, n.nE±s where n is the base, s is the exponent to the base 10; the plus sign may be omitted if s is positive (3.1E1, 31.4E-01, .314E+1 are all valid).

c. Double precision values are not allowed.

d. There is no complex value input except where specifically expressed. In such cases, the real and imaginary values are given as two parameters; for example, for a RCEPT = EED (electro-explosive device), the function is given as a complex number specified as 2 parameters: i.e., RC = EED, 30, 1, 1, (30, 1, 0, 1.E10, 1, 0).

10. The following rules apply to the order of the data:

a. The execute card (EXEC =) must be the first card of the run.

b. The execute card should be followed by the identification cards (TITLE and REMARK) and input/output control cards (LIST and OUTPUT). There is no specified order to these four cards.

c. The data defining the system is grouped into three groups and these groups must be given in the following order:

1. System data

2. Subsystem data

3. Bundle data

The individual cards that belong to each of these groups are given in the Tables 144 - 148.

d. The data cards belonging to the group 1, system data (SYSTEM, ANTENNA, FILTER, etc.), may be in any order.

e. In group 2, the data must be given in hierarchical order as follows:

1. Subsystem

2. Equipment

3. Frequency

4. Port

5-6. Source or receptor (either order)

4-6. Cards repeat for a maximum of 15 ports; 2-6 repeat for a maximum of 40 equipments; 1 is inserted where applicable.

f. For new jobs, the first port of an equipment must be the CASE. A source or receptor card also must be given for it.

g. At least one subsystem card must be given prior equipment data.

h. Port ID's must be unique within an equipment.

i. A subsystem must have at least one equipment.

j. On new jobs, an equipment must have at least one port, a port must have at least one source or receptor or both. It may not have multiple sources or receptors.

k. In group 3, bundle data, the bundle identification must be the first card, followed by other bundle data in any order.

l. Each bundle must have one and only one bundle segment and one and only one bundle points card and at least one wire card.

m. For multiple entry keywords, the following maximum system specifications must not be exceeded:

EQUIPMENTS:	40
PORTS per EQUIPMENT:	15
TOTAL PORTS:	600
APERTURES:	10

ANTENNAS:	50
BUNDLES:	10
SEGMENTS per BUNDLE:	10
WIRES per BUNDLE:	50

n. The last card must be an EODATA card. ETOD can be used instead for trade off runs.

6.1.4 Modifying the ISF File

Any ISF file can be used as input to an IEMCAP run, with data cards being used to modify any of the ISF data. This ISF file can be created by an IDIPR run, a TART run, or the merge utility program.

To use an ISF with input modification in a IDIPR run, the job status on the EXEC card must be MOD. Three types of modifications can be made to the ISF: add, delete, or modify. These modifications would be specified as the modify code word following the keyword on a data card. A list of rules governing the modify process is given below.

1. All data from the old ISF file is included unless overridden or deleted by an input card.

2. All rules given for Input Data apply except where exceptions are given in this section.

3. All added subsystems must follow those to be modified or deleted.

4. Within an equipment, all new equipments to be added must follow those equipments modified or deleted.

5. The data to modify subsystems and equipments must be given in the same order as they are on the Intrasystem File being modified. Hence, in setting up a modify run, the user must have a listing of the equipments on the ISF, as this is the order on the file.

6. Within an equipment, new ports and modifications to existing ports can be in any order.

7. A system data entry, such as an antenna or filter, is deleted by giving a keyword, modify code equals sign and identification. For example, ANT(D) = ABX2.

8. There is no order to the system data entries, including those which modify the ISF data.

9. Bundles to be modified must be in the same order as they appear on the ISF.

10. All bundles to be added must follow those which modify existing TSF bundles.

11. Subsystem data and bundle data belong to a hierarchical system. This means that modifications to an upper level apply to all its lower components, that is, those components that have the upper level components ID as an implicit ID. It also means that in order to modify a lower level, it is necessary to specify all upper level ID's that define it; that is, all its implicit ID's. For example, to delete port XY2 of equipment TACAN of subsystem AC01, the following would be specified:

SU(M) = AC01

EQ(M) = TACAN

PO(D) = XY2

12. If a higher level keyword card has only a modification code, equals sign and an ID on it, the parameters of the keyword itself will not be modified; instead, the ID is used to give an implicit ID to a lower level keyword. If, however, parameters follow the ID, they will override those parameters of the keyword. If any parameters are given, all parameters must be specified, even if some parameters are unchanged in value.

13. Any higher level keyword, such as subsystem, can be used to denote all equipments associated with it. For example, a subsystem with a delete modification code and an ID would delete all equipments associated with it. If one equipment of a subsystem is to be deleted, the subsystem would have "modify" specified so as not to delete the other equipments. For example, to delete TACAN, specify

SU(M) = AC01

EQ(D) = TACAN

14. The default modify status, if not specified is "Add." On a NEW run, no modification code needs to be specified for any data.

TABLE 144

IDIPR INPUT DATA CONTROL AND WAIVER ANALYSIS CARDS

FORMAT	NOTES
EXEC = TASK, JOB STATUS, CTASK, CERR	1
TITLE = (title data)	
REMARK = (remark)	
LIST = NISF, OISF	2
OUTPUT = ISF	3
COMMENT = (comment)	4
WA = SID, EID, PID, fs_1, fs_2, ds, fr_1, fr_2, dr	5

NOTES:

1. TASK specifies which task is to be performed: ISP, SGR, CEAR. JOB STATUS specifies OLD, NEW or MOD system. CTASK specifies a subtask option if TASK = CEAR. Subtasks are TO - trade off, WA - waiver analysis, SU - EMI survey. CERR specifies that ISP is to be run regardless of input errors.

2. NISF specifies whether a report of the new ISF file is listed. OISF specifies whether a report of the old ISF file is listed.

3. ISF specifies whether a new ISF file is to be created in an IDIPR run.

4. Any number of comments can be inserted into the data. They will be printed with the listing of the data only. Title or remarks should be used if comments are to be saved on the ISF.

5. Subsystem ID, equipment ID, port ID, low frequency of source shift range, high frequency of source shift range, displacement for source spectra, low frequency of receptor shift range, high frequency of receptor shift range, displacement for receptor spectrum.

TABLE 145

IDIPR SYSTEM INPUT DATA

FORMAT	NOTES
SYSTEM = TYPE, longitude, latitude, altitude, adjustment safety margin, EMI print limit	1
FUSLGE = F_{sn}, $P\delta$, P_c, wl_c, wl_{BOT}, MDL	2
WNGRT = bl, wl, fs_f, fs_a	3
WGTIP = bl, wl, fs_f, fs_a	3
APER = APID, bl, wl, fs, width, length, WGLOC (This record is repeated for each aperture, up to a maximum of 10.)	4
ANT = AID, MODEL CODE, POLAR, (p_1, p_2, ...) (This record is repeated for each antenna, up to a maximum of 50.)	5
FILTER = FID, TYPE, no. stages/order, (p_1, p_2, ...) (This record is repeated for each filter, up to a maximum of 20.)	6
WRTBL = WTDID, SH/UN/DS, no. wires twisted, cond. diam., conductivity, insul. thick, dielect const., shield int. diam,. sh. thick, jacket thick, shld-cond cap., 2nd shld, int. diam., 2 shld thickness (This record is repeated for each wire type, up to a maximum of 20.)	7
OEFL = eo_1, eo_2, ...	8
IEFL = ei_1, ei_2, ...	9
EFQ = ef_1, ef_2, ...	10

NOTES:

1. SYSTEM CARD: TYPES are AIR, GROUND or SPACE. For ground, specify GROUND (conductivity, relative permittivity).

2. FUSELAGE CARD: Fuselage conical nose limit, fuselage radius, core radius, centroid of water line, bottom water line, round or flat bottom code. All dimensions in inches.

3. WINGROOT AND WINGTIP CARD: Butt line, water line, forward and aft fuselage station of wingroot/wingtip. All dimensions in inches.

TABLE 145 (Concluded)

4. APERTURE CARD: Aperture ID, butt line, water line, fuselage station, width, length, wing location: NOW (not on wing), BOT (bottom of wing), TOP (top of wing), FWD (forward edge of wing), AFT (aft edge of wing, TIP (tip of wing). All dimensions in inches.

5. ANTENNA CARD: Antenna ID, antenna type, polarization (HZ, VE or CI), (length in inches, maximum gain in dB, vertical half beamwidth, azimuth half beamwidth, side lobe gain, side lobe angle, back lobe gain).
Antenna types are DIPOLE, WHIP, SLOT, LOOP, PARDSH, (parabolic dish), LGPER (log periodic), HORN, SPIRAL, PSDAR (phased array).

6. FILTER CARD: Filter ID, filter type, number of stages or order, (filter parameters which vary with filter type).

TYPE	PARAMETERS
SGTUN	single tuned stage (fo, B, γ, isol)
TRCOUP	transformer coupled stage (fo, γ, isol, Q, m)
BUTTER	Butterworth tuned (fo, B, γ, isol)
LOWPAS	low pass (f_μ, γ, isol)
HIPAS	high pass (f_1, γ, isol)
BPASS	band pass (f_1, f_μ, γ, isol)
BRJCT	band reject (f_1, f_μ, γ, isol)

where fo = tuned frequency, B = bandwidth, γ = insertion loss, isol = isolation, Q = circuit Q, m = inductive coupling factor, f_μ = upper break point, and f_L = lower break point.

7. WIRE CHARACTERISTICS TABLE CARD: Wire type ID, shielded/double shielded/unshielded code, number of twisted wires, conductor diameter, conductor conductivity, insulation thickness, dielectric constant, internal diameter of shield, thickness of shield, thickness of jacket, shield-to-inner-conductor capacitance, internal diameter of second shield, thickness of second shield.

8. OUTSIDE ENVIRONMENTAL FIELD CARD: Optional table of external environmental field levels, up to 90.

9. INSIDE ENVIRONMENTAL FIELD CARD: Optional table of internal environmental field levels, up to 90.

10. ENVIRONMENTAL FIELD FREQUENCY CARD: Table of corresponding frequencies, up to 90. Must be included if outside or inside environmental field levels are given.

TABLE 146

IDIPR SUBSYSTEM INPUT DATA

FORMAT	NOTES
SUBSYS = SSID	1

NOTES:

1. Alphanumeric subsystem identification

TABLE 147

IDIPR EQUIPMENT, PORT AND SOURCE/RECEPTOR INPUT DATA

FORMAT	NOTES
EQPT = EID, SPEC, FIXADJ, COMP, CLASS, bl, wl, fs	1
FREQ = f_l, f_u, N_{fo}, N_{fmax}	2
FTQTBL = f1, f2, f3, ...	3
PORT = PID, P1, P2, P3, ...	4
SOURCE = SR CODE, adjlim, P1, P2, P3, ...	5
RCEPTOR = SR CODE, adjlim, P1, P2, P3, ...	5
(Last three records are repeated for each port, and entire format is repeated for each equipment.)	

NOTES:

1. EQUIPMENT CARD: Equipment ID, EMC specs to be used as starting point (M461A, M6181D), fixed or adjustable EMC limit, compartment ID, security classification (none, confidential, secret, top secret), water line, butt line, fuselage station.

2. FREQUENCY CARD: Lowest frequency, highest frequency, number of frequencies per octave, maximum number of frequencies in spectrum.

3. FREQUENCY TABLE CARD: List of frequencies in spectrum.

4. PORT CARD:

(a) For equipment case: port ID, initial spectrum displacement for source, initial displacement for recep or.

(b) Otherwise: port ID, wire or antenna, (subparameters depending on wire or antenna), resistance, capacitance, inductance, initial spectrum displacement for source, initial displacement for receptor, filter ID.

(c) Subparameters for wire: bundle ID, wire ID, point ID, reference to return circuit (ground, shield, balanced wire or unbalanced wire return, shield grounding configuration ("none" if wire is unshielded; "open" or "grounded" if wire is shielded; "open-open", "open-grounded", etc. if wire is double shielded), exposure to aperture (exposed or not exposed).

(d) Subparameters for antenna: (antenna ID, vertical pointing angle, azimuthal pointing angle, water line, butt line, fuselage station, wing location code (code same as aperture)).

TABLE 147 (Continued)

5. SOURCE/RECEPTOR CARD

(a) For equipment case: "CASE", spectrum adjustment limit, narrowband specification spectrum, broadband specification spectrum (for narrow or broadband specifications, a user-provided table of frequency$_1$, level$_1$, etc., up to ten user levels, may be given or the alpha code word, MIL SPEC, to get the mil spec for the equipment).

(b) For radio frequency: "RF", spectrum adjustment limit, lowest tuned frequency, highest tuned frequency, power or sensitivity, channel bandwidth, RF modulation code (subparameters), (harmonic displacement level relative to fundamental for 2nd, 3rd, up to 10th), intermediate frequency for receptor only.

RF MODULATION CODE		SUBPARAMETERS
CW	continuous wave	none
PDM	pulse duration modulation	bit rate
NRZPCM	NRZ pulse code modulation	bit rate
BPPCM	biphase pulse code modulation	bit rate, modulation index
PPM	pulse position modulation	bit rate, pulse width
TELEG	conventional telegraph	words per minute, tone frequency
FSK	frequency-shift keying	bit rate, frequency separations
PAMFM	pulse amplitude modulation	peak frequency deviation
RADAR	radar	
	rectangular pulse RECTPL,	bit rate, pulse width
	trapezoidal pulse TPZD,	bit rate, pulse width, rise and fall time
	cosine squared COSQD,	bit rate, pulse width
	gaussian pulse GAUSS,	bit rate, pulse width
	chirp radar pulse CHIRP,	bit rate, pulse width, rise and fall time, compression ratio
AM	amplitude modulation	signal type (voice, clipped voice, or non voice), bandwidth, modulation index
DSBSC	double side band suppressed carrier	signal type, bandwidth
LSSB	single side band, lower	signal type, bandwidth
USSB	single side band, upper	signal type, bandwidth

TABLE 147 (Continued)

RF MODULATION CODE		SUBPARAMETERS
FM	frequency modulation	signal type, bandwidth, frequency deviation
LOLKG	local oscillator leakage from receivers	narrow band level, broad band level
SPECT	user supplied spectra	$freq_1$, $level_1$, etc. ...

(c) For power line: "POWER," adjustment limit, voltage, frequency, number of harmonics, number of phases, RS CODE, (subparameters).

RS CODE		SUBPARAMETERS
M461A	MIL-STD-461A	none
M6181D	MIL-STD-6181D	none
M704A	MIL-STD-461A	none
SPECT	user supplied spectrum	$freq_1$, $level_1$, etc. ...

(d) For signal/control line: "SIGNAL" or "CNTROL", spectrum adjustment limit, lowest operating frequency, highest operating frequency, signal code (subparameters), voltage or current, units code, bandwidth.

SIGNAL CODE		SUBPARAMETERS
PDM	pulse duration modulation	bit rate
NRZPCM	NRZ pulse code modulation	bit rate
BPPCM	biphase pulse code modulation	bit rate, modulation index
PPM	pulse position modulation	bit rate, pulse width
TELEG	morse telegraph	words per minute, tone frequency
PAM	pulse amplitude modulation	bit rate, pulse width
ESPIKE	spike	bit rate, pulse width
RECTPL	rectangular pulses	bit rate, pulse width
TPZD	trapezoidal pulses	bit rate, pulse width, rise time
TRIANG	triangular pulses	bit rate, pulse width
SAWTH	sawtooth wave	bit rate, pulse width
DMPSIN	damped sinusoids	bit rate, real frequency, imaginary frequency

TABLE 147 (Concluded)

SIGNAL CODE		SUBPARAMETERS
VOICE	voice	none
CVOICE	clipped voice	none
SPECT	user provided spectrum	$frequency_1$, $level_1$, etc. ...

(e) For electro-explosive device: "EED", spectrum adjustment limit, maximum power for no fire, maximum current for no fire, (frequency, real part of load $impedance_1$, imaginary part of load $impedance_1$, ... etc.).

TABLE 148

IDIPR BUNDLE INPUT DATA

FORMAT	NOTES
BUNDLE = BID	1
BPTS = PTID, X_1, Y_1, Z_1, ...	2
BSEG = $PTID_1$, $PTID_2$, sl, sh, COMPID, APID, ...	3
WIRE = WID, WTYPE, PTID, PTID, PTID, PTID, ...	4
(This record is repeated for each wire in the bundle and entire group is repeated for each bundle.)	

NOTES:

1. Bundle identification card: Bundle ID

2. Bundle points input card: Point ID, x,y,z, coordinates, (repeated for remaining bundle points).

3. Bundle segments input card: Point 1 ID, Point 2 ID, segment length, segment height, compartment ID, aperture ID, (repeated for remaining bundle segments).

4. Wire input card: Wire ID, wire type ID, wire point ID's.

6.2 TART CARD INPUT

The only card input required for TART is a control card specifying the task to be performed, and options to be used, as given below. An operational card for additional input may also be used.

TART = TASK, AI, SP

where TASK = SGR for specification generation
= TO for trade off analysis
= WAIVER for waiver analysis
= SURVEY for baseline EMC survey

AI = AI, additional input card follows control card. This card contains the EMI margin print limit (EMPL) in Cols 1-10 and the SGR adjustment safety margin (ASM) in Cols 11-20. Both parameters must be right-justified within these fields.

AI = NOAI or not given signifies no additional input card follows. EMPL and ASM are as specified for IDIPR.

SP = SP if supplemental printouts from transfer model routines are desired.

= NOSP or not given signifies no printouts from the transfer model routines are desired.

Example: TART = SGR, AI, SP

10. -20. (additional input card)

6.3 DATA FILES

A list of all the files used by IDIPR and TART, along with other pertinent information, is given in Table 149, and detailed formats of the data contained in these files is given in Tables 150 to 159. A description of each of the files follows:

1. System Input. The system input file refers to user defined input data discussed above containing all the control cards needed to run IDIPR or TART, as well as the data describing a system or modifications to a system for IDIPR.

2. CARDIN. This file is used by IDIPR to store the card images of the input cards during input decode. It is later overwritten and used as the Wire Map File.

3. Processed Input File (PIF). This file is built by IDIPR during input decode. For new jobs (no old ISF exists), the format of the PIF is the same as the ISF except there are no emitter and receptor spectra. For modify jobs, the system data is not written on the PIF, but the equipment and wire bundle data is written in the same format as on the ISF.

4. Old Intrasystem Signature File (Old ISF). This is an input file created during a previous run either by IDIPR or TART. It contains data defining the system being analyzed including user - defined input parameters, processed data, and port spectra. It may or may not be present for a given run. If not present, the system is defined by card input only. If present, the old ISF data may be analyzed as is or modified by additional card inputs. A user can have as many different ISF's as desired, although only one is used as input per run.

5. New Intrasystem Signature File (Generated by IDIPR). An output file created by IDIPR from the card input data or from an old ISF modified by card input. The format is identical to the old ISF described above. It is used as input for TART.

6. New Intrasystem Signature File (Generated by TART). An output file created by TART during specification generation runs. It is identical to the above new ISF except that it contains the adjusted port spectra.

7. Unadjusted Emitter Spectrum File (UESF). This file, as built during initial processing, contains the initial broadband and narrowband spectra for all emitter ports. During specification generation runs, SGR adjusts these spectra and writes them on the adjusted emitter spectrum file (AESF). After all emitters have been examined and adjusted in conjunction with a given receptor, the AESF and UESF are swapped, and the process is repeated for the next receptor. For analysis tasks other than SGR, the UESF is used only as input by TART since no spectrum adjustments are made.

8. Unadjusted Receptor Spectrum File (URSF). This file is the same as the UESF above except it contains receptor port spectra.

9. Receptor Equipment Data File (EEDF). This file is built during initial processing containing all equipment and port parameters, except the spectra and spectrum pointers, for receptor ports. Because TART selects a receptor and analyzes all emitter ports against it, equipment data is written on separate files for emitters and receptors for efficient processing. If a given port is both an emitter and receptor, the data is on both files.

10. Emitter Equipment Data File (REDF). This is the same as the EEDF above except it contains emitter data.

11. Wire Bundle File (BUNDLE). This file, built during initial processing, contains all wire bundle data for the system. This data is in the form specified in IDIPR input data.

12. Wire Map File. This file built during initial processing contains processed wire bundle data in the form of cross-reference map arrays relating the wires, segments, and ports. This data is used as input to the wire-to-wire and field-to-wire transfer model routines in TART.

13. Array. This file, built during initial processing, contains basic system data, control flags, data change codes, and other data for use by TART.

14. Adjusted Emitter Spectrum File (AESF). This file is used by TART during specification generation and contains the adjusted spectra for the emitter ports. The logical unit switches back and forth between AESF and UESF files each time the emitter spectra are readjusted as discussed above for the UESF.

15. Adjusted Receptor Spectrum File (ARSF). This file is the same as the AESF except that it contains the adjusted receptor spectra.

16. Baseline Transfer File. This file is built by TART during SGR or survey runs and contains the received signals, transfer ratios, and EMI margins for all coupled port pairs and from the total signal and environmental field into each receptor at all frequencies. This is an input to TART for waiver analysis and trade-off analysis runs.

17. SGR Scratch File (SCRF). This is used during specification generation to store adjusted emitter spectra and transfer functions used in the determination of unresolved interference. The logical unit used is the one which was not used to store the final adjusted emitter spectra.

18. Scratch Transfer File (SCHTR). This file is used by TART during specification generation and contains the transfer ratio from each coupled to emitter into the receptor at each frequency.

TABLE 149

FILES USED BY IDIPR AND TART

	FILE NAME	TYPE	USE*	IDIPR Mnemonic	TART Mnemonic	Logical Unit	Usual Device	IDIPR TASK Requiring File (I=input, 0=output)	TART TASK Requiring File (I=input, 0=output)
1.	SYSTEM INPUT	BCD	T	INN	INN	5	CARDS	ALL (I)	(I)
2.	CARDIN	BCD	T	IT3	-	3	DISK	All (O/I)	-
3.	Processed Input File (PIF)	BCD	T,P	IT1	-	1	DISK	All (O/I)	-
4.	Old Intrasystem Signature File (ISF)	BCD	P	IT4	-	4	TAPE/ DISK	All If jobstatus= OLD or MOD (I)	-
5.	New ISF (Generated by IDIPR)	BCD	P	IT6	IT4	16	TAPE/ DISK	SGR,CEAR,optional for ISP (0)	All (I)
6.	New ISF (Generated by TART)	BCD	P	-	IT6	22	TAPE/ DISK	-	SGR (0)
7.	Unadjusted Emitter Spectra	Binary	I	IT10	IUESF	10	DISK	SGR,CEAR (0)	SGR (I/0) All others (I)
8.	Unadjusted Receptor Spectra	Binary	I	IT11	IURSF	11	DISK	SGR,CEAR (0)	SGR (I/0) All others (I)
9.	Emitter Equipment File	Binary	I	IT12	IEEDF	12	DISK	SGR,CEAR (0)	All (I)
10.	Receptor Equipment File	Binary	I	IT13	IREDF	13	DISK	SGR,CEAR (0)	All (I)
11.	Wire Bundle File	Binary	I	IT14	IWBF	14	DISK	SGR,CEAR (0)	All (I)
12.	Wire Map File	Binary	I	IT25	IWMF	3	DISK	SGR,CEAR (0)	All (I)
13.	Array	Binary	I	ITXX	ITXX	21	DISK	SGR,CEAR (0)	All (I)
14.	Adjusted Emitter Spectra	Binary	T	-	IAESF	17 or 10	DISK	-	SGR
15.	Adjusted Receptor Spectra	Binary	T	-	IARSF	18	DISK	-	SGR
16.	Baseline Transfer File	Binary	P	-	ITRNF	19	DISK	-	SGR
17.	SGR Scratch File	Binary	T	-	ISCRF	10 or 11	DISK	-	SGR (I/0)
18.	Scratch Transfer File	Binary	T	-	ISCHTR	22	DISK	-	SGR (I/0)
19.	[illegible] Output	BCD	T	IO	IOU	6	PRINTER	All (0)	All (0)

*NOTE: T = [illegible] File; P = Permanent File; I = Intermediate File between IDIPR and TART

TABLE 150

INTRASYSTEM SIGNATURE FILE

RELATIVE RECORD NO.	RELATIVE WORD LOCATION	DESCRIPTION	IDIPR PROGRAM MNEMONIC
1	1	Number of antennas	NANT2
	2	Number of filters	NFTR2
	3	Number of entries in wire characteristics table	NWCT2
	4	Number of characters in title	ITITL
	5	Number of characters in remarks	IRMRK
	6	System type code	ISYS2
	7	Number of apertures	NAPR2
	8	Number of environmental field level arrays	NEFQ2
	9	Environmental field level flag	IEOI2
2	1	If ITITL > 0 Title	TITLE(I), I = 1, ITITL
3	1	If IRMRK > 0 Remarks	RMRK(I), I = 1, IRMRK
4	1	Longitude (ground station)	SLON
	2	Latitude (ground station)	SLAT
	3	Altitude (feet) ground station only	ALT
	4	Adjustment safety margin	ASM
	5	EMI margin print limit	EMPL
	6	Conductivity (ground station)	SIGMA
	7	Relative permittivity	EPSR
	8	Spare	THETA
	9	Spare	RADIUS
		If SYS2 ≠ 2	
5	1	Conical nose limit (inches)	FSN
	2	Fuselage radius	RHOF
	3	Core radius	RHOC
	4	Water line of centroid	WLC
	5	Water line of bottom	WLBOT
	6	Model code; 0 = round, 1 = flat	MDL

TABLE 150 (Continued)

RELATIVE RECORD NO.	RELATIVE WORD LOCATION	DESCRIPTION	IDIPR PROGRAM MNEMONIC
		If SYS2 = 1	
6	1	Butt line of wing root	WRBL
	2	Water line of wing root	WRWL
	3	Fuselage station of forward wing root	WRFFS
	4	Fuselage station of aft edge of wing root	WRAFS
	5	Butt line of wing tip	WTBL
	6	Water line of wing tip	WTWL
	7	Fuselage station of forward edge of wing tip	WTFFS
	8	Fuselage station of aft edge of wing tip	WTAFS
7	1	If NEFQ2 > 0 Environmental field level frequencies	EFQ2(I), I = 1, NEFQ2
8	1	If IEOI2 = 1 or IEOI2 = 3 Outside environmental field levels	EO2(I), I = 1, NEFQ2
9	1	If IEOI2 = 2 or IEOI2 = 3 Inside environmental field levels	EI2(I), I = 1, NEFQ2
10		If NAPR ≤ 10 and NAPR ≠ 0	
	1	Aperture integer array	IAPPM2(I, 1)
	2	Aperture floating point array	APPRM2 (I, J) J = 1, 5
	3	Aperture integer array	IAPPM2 (I, 2) I = 1, NAPR
11	1	If NANT > 0 and NANT ≤ 51 Antenna integer array	IAPM2 (IANT, I), IANT = 1, NANT, I = 1, 4
12	1	Antenna floating point array	APRM2 (IANT, I), IANT = 1, NANT, I = 1, 7
13	1	If NFTR > 0 and NFTR ≤ 21 Filter integer array	IFLT2 (IFTR, I), IFTR = 1, NFTR I = 1, 4

TABLE 150 (Continued)

RELATIVE RECORD NO.	RELATIVE WORD LOCATION	DESCRIPTION	IDIPR PROGRAM MNEMONIC
14	2	Filter floating point array	FPRM2 (IFTR, I) IFTR = 1, NFTR, I = 1, 6
15	1	If NWCT > 0 Wire characteristics table integer array	IWCT2 (I, J) I = 1, NWCT, J = 1, 3
16	2	Wire characteristics table floating point array	WCT2 (I, J) I = 1, NWCT, J = 1, 10
17		If IEQ > 0 and IEQ ≤ 40	
	1	Equipment index	IEQ
	2	Number of ports/equipment	NP2
	3	Equipment integer array	IEPRM2(I), I = 1, 6
	4	Dummy placeholder	IDUM
	5	Dummy placeholder	IDUM
	6	Number of frequencies per octave	NFQO2
	7	Number of user supplied frequencies (up to 90)	NFQU2
	8	Number of frequencies to be used for the equipment as output	NFRQ
	9	Maximum number of frequencies	NFQMX
18		If IGO ≠ 4	
	1	Equipment floating point array	EPRM2(I), I = 1, 5
	2	Highest frequency to be considered as specified by user	FHI2
	3	Lowest frequency to be considered as specified by user	FLO2
19	1	If NFQU2 > 0 and NFQU2 ≤ 90 Number of user supplied frequencies (up to 90)	FQTBL2(I) I = 1, NFQU2
20	1	If NFRQ > 0 and NFRQ ≤ 90 Frequency table	FRQTBL(I) I = 1, NFRQ

TABLE 150 (Continued)

RELATIVE RECORD NO.	RELATIVE WORD LOCATION	DESCRIPTION	IDIPR PROGRAM MNEMONIC
21	1	If NFRQ > 0 Minimum frequencies for 6 port types for source and receptor	IFMIN
	2	Maximum frequencies for 6 port types for source and receptor	IFMAX
22	1	If NP > 0 and NP ≤ 15 Port integer array	IPPRM2(IPRT, I), IPRT = 1, NP, I = 1, 10
23	2	Port floating point array	PPARM2(IPRT, I), IPRT = 1, NP, I = 1, 10
24	1	If ITYP = 1 or ITYP = 2 Source integer array	ISO2(IPRT, I), I = 1, 6
25	2	Source floating point array	SRCE2(IPRT, I), I = 1, IEND
26	1	If ISR ≠ 1 and NR > 0 and NR ≤ 20 Source floating point array	SRCE2(IPRT, I), I = IS, IEND2
27	1	If ITYP = 2 or ITYP = 3 Receptor integer array	IRO2(IPRT, I), I = 1, 6
28	2	Receptor floating point array	RPRM2(IPRT, I), I = 1, IEND
		Receptor floating point array	RPRM2(IPRT, K)
29	1	Minimum frequency for emitter	IF1E
	2	Maximum frequency for emitter	IF2E
	3	Minimum frequency for receptor	IF1R
	4	Maximum frequency for receptor	IF2R
	5	Subsystem ID	IDSS
	6	Equipment ID	IDEQ
	7	Port ID	IDPRT
	8	Minimum required frequency for emitter	RFR1E

TABLE 150 (Continued)

RELATIVE RECORD NO.	RELATIVE WORD LOCATION	DESCRIPTION	IDIPR PROGRAM MNEMONIC
	9	Maximum required frequency for emitter	RFR2E
	10	Minimum required frequency for receptor	RFR1R
	11	Maximum required frequency for receptor	RFR2R
	12	Effective bandwidth of emitter	BWE
	13	Effective bandwidth of receptor	BWR
		If IF1E ≠ 0	
30	1	Emitter spectra (Narrow band and broad band)	SPE(I, J), I = 1, 2, J = IF1E, IF2E
	2	Emitter spectrum limit (Narrow band and broad band)	SPELIM(I, J), I = 1, 2, J = IF1E, IF2E
		If IR ≠ 0	
31	1	Receptor spectrum	SPR(J) J = IF1R, IF2R
	2	Receptor spectrum limit	SPRLIM(J) J = IF1R, IF2R
32	1	End of eqpt data flag	999 999
		If IWB2 > 0 and IWB2 ≤ 50, NWS > 0 and NWS ≤ 10	
33	1	Bundle index	IWB2
	2	Number of bundle segments	NWS
	3	Ending index in bundle segments integer array	NWS41
	4	Number of bundle segments times 2	NWS2
34	1	Bundle index	IWB2
	2	Bundle integer array	IBPRM2(I), I = 1, 3
	3	Bundle segment integer array	IBEP2(I), I = 1, NWS41
		If K > 0 and K ≤ 40	
35	1	Bundle node point integer array	IBPT2(I), I = 1, K

TABLE 150 (Concluded)

RELATIVE RECORD NO.	RELATIVE WORD LOCATION	DESCRIPTION	IDIPR PROGRAM MNEMONIC
36	1	Bundle node point floating point array	BPTC2(I), I = 1, J
37	1	If NWS2 > 0 and NWS2 ≤ 40 Bundle segment floating point array	BEP2(I), I = 1, NWS2
38	1	If IWIR > 0 and IWIR ≤ 50 Wire integer array	IWPRM2(IW, J) IW = 1, IWIR, J = 1, 3
39	1	If K > 0 and K ≤ 15 Wire integer array	IWPRM2(IW, J) J = 4, K IW = 1, IWIR
40	1	End of bundle data flag	999 999

TABLE 151

UNADJUSTED EMITTER SPECTRUM FILE

MNEMONIC USED IN TART	DESCRIPTION	NOTES
IF1E IF2E RFR1E RFR2E BWCE (IPVE(I), I = 1,3) IEQE IPRTE	Lowest frequency pointer Highest frequency pointer Lowest required frequency Highest required frequency Equivalent emitter bandwidth Subsystem, equipment, port packed ID's Equipment index Port index	1
((SPE (I, J), I = 1,2), J = IF1E, IF2E) ((SPELIM (I, J), I = 1,2), J = IF1E, IF2E)	Narrow band (I = 1) and broad band (I = 2) emission levels Narrow band and broad band emission limits	

NOTE:

1. This block represents a logical record in the file. The second block represents another logical record. These two records are repeated for every emitter port, by equipment. After the last emitter port, an end of file is indicated by IF1E = 999.

TABLE 152

UNADJUSTED RECEPTOR SPECTRUM FILE

MNEMONIC USED BY TART	DESCRIPTION	NOTES
IF1R	Lowest frequency pointer	1
IF2R	Highest frequency pointer	
RFR1R	Lowest required frequency	
RFR2R	Highest required frequency	
BWCR	Equivalent receptor bandwidth	
(IPVR(I), I = 1,3)	Subsystem, equipment, port packed ID's	
IEQR	Equipment index	
IPRTR	Port index	
(SPR(I), I = IF1R, IF2R)	Susceptibility levels	
(SPRLIM(I), I = IF1R, IF2R)	Susceptibility limits	

These two logical records are repeated for every receptor port, by equipment, in the same manner as in the unadjusted emitter spectrum file.

NOTE:

1. End of file indicated by IF1R = 999

TABLE 153

EMITTER EQUIPMENT FILE

MNEMONIC USED BY TART	DESCRIPTION	NOTES
IEQEF NPRTE	Equipment index Number of ports for this equipment	
(IEPRME(I), I = 1, 6) NFQ02 NFQU2 NFQE NFQMX	Equipment integer array (see 5.2) Number of frequencies per octave Number of user supplied frequencies Number of frequencies in operating range Maximum number of frequencies	
(EPRME (I), I = 1, 5) FHI2 FLO2	Equipment floating point array (see 5.2) Highest frequency Lowest frequency	
If NFQU2 > 0 (FQTBLU (I), I = 1, NFQU2)	Table of user supplied frequencies	
If NFQE > 0 (FQTE (I), I = 1, NFQE)	Table of frequencies in operating range	
I	Dummy read	
(IPPRME (I,J), I = 1 NPRTE), J = 1, 10	Port integer array (see 5.2)	
(PPARME (I,J), I = 1, NPRTE), J = 1, 10)	Port floating point array (see 5.2)	
(ISOE (I,J), J = 1, 6)	Source integer array (see 5.2)	
(SRCE (I,J), J = 1, N)	Source floating point array (see 5.2)	1
If ISRE = 1 and NR > 0 (SRCE (I,J), J = N + 1, N + NR)	Spurious harmonic levels for rf port	2

The last three logical records are repeated for I = 1, NPRTE but skipping values of I when IPPRME (I, 10) = 2 (skip the ports that are not emitters). The entire format is then repeated for each equipment.

NOTES:

1. If an equipment case, N = ISOE (I,2) + ISOE (I,3) + 1
Otherwise, N = ISOE (1,3) + 5

2. NR is the number of spurious harmonic levels.

TABLE 154

RECEPTOR EQUIPMENT FILE

MNEMONIC USED BY TART	DESCRIPTION	NOTES
IEQRF NPRTR	Equipment Index Number of ports for this equipment	
(IEPRMR(I), I = 1, 6) NFQO2 NFQU2 NFQR NFQMX	Equipment integer array (see 5.2) Number of frequencies per octave Number of user supplied frequencies Number of frequencies in operating range Maximum number of frequencies	
(EPRMR(I), I = 1, 5) FHI2 FLO2	Equipment floating point array (see 5.2) highest frequency Lowest frequency	
If NFQU2 > 0 (FQTBLU (I), I = 1, NFQU2)	Table of user-supplied frequencies	
If NFQR > 0 (FQTR (I), I = 1, NFQR)	Table of frequencies in operating range	
I	Dummy read	
((IPPRMR(I,J), I = 1, NPRTR), J = 1, 10)	Port integer array (see 5.2)	
(PPARMR(I,J), I = 1, NPRTR, J = 1, 10)	Port floating point array (see 5.2)	
(IROR (I, J), J = 1, 6)	Receptor integer array (see 5.2)	
(RPRM (I,J), J = 1, N) RPRM (I,M)	Receptor floating point array (see 5.2) IF bandwidth	1,2

The last three logical records are repeated for I = 1, NPRTR, skipping values of I when IPPRMR (I, 10) = 1. (Skip the ports that are not receptors. The entire format is repeated for each equipment.)

NOTES:

1. If electro- explosive device, N = IROR (1,3) + 3
   If equipment case, N = IROR (I,2) + IROR (1,3) + 1
   Otherwise, N = IROR (I,3) + 5

2. If RF port and user-supplied spectrum, M = IROR (1,3) + 6
   Otherwise, M = 11

TABLE 155

WIRE BUNDLE FILE

MNEMONIC USED BY TART	DESCRIPTION	NOTES
IBNDLE (IBPRM2 (I), I = 1,3) IBEP2(1)	Bundle index Bundle integer array Bundle segments integer array	
(IBEP2(I), I = 2,N)	Bundle segments integer array	1
(IBPT2(I), I = 1,N)	Bundle node points integer array	2
(BPTC2(I), I = 1,N)	Bundle node points floating point array	2
(BEP2(I), I = 1,N)	Bundle segments floating point array	3
((IWPRM2 (I, J), I = 1,N), J = 1,3)	Wire integer array	4
IWPRM2 (I, J), J = 4,N	Wire integer array	5

The last logical record is repeated for every wire in the bundle, and then the whole format is repeated for every wire bundle

NOTES:

1. N = 4 x (number of bundle segments) + 1
2. N = 3 x (number of bundle points)
3. N = 2 x (number of bundle points)
4. N = number of wires
5. N = number of wire points

TABLE 156

WIRE MAP FILE

MNEMONIC USED BY TART	DESCRIPTION	NOTES
KBUN	Index of bundle	
NWIRES	Number of wires	
NBSEG	Number of bundle segments	
AVGSEP	Average separation between two wires	
(SEGLTH(I), I = 1,10)	Length of Ith segment	
(SEGHT(I), I = 1,10)	Height of Ith segment	
(IDAP (I), I = 1,10)	ID of aperture to which Ith segment is exposed	
((IWID(I))	ID of Ith wire	
IWTYP (I)	Wire type ID of Ith wire	
WIRL (I)	Length of Ith wire	
(NFLAG (I,J), J = 1,10)	Termination flag of Ith wire, Jth segment	
(IS1 (I,J), J = 1,10)	Number of grounds on left side of Ith wire, Jth segment	
(IS2 (I,J), J = 1,10)	Number of grounds on right side of Ith wire, Jth segment	
(((IEND1 (I,J,K), K = 1,11), J = 1,10), I = 1, NWIRES)	Packed list of port connections for Ith wire, Jth segment	

These two logical records are repeated for every wire bundle

TABLE 157

BASELINE TRANSFER FILE

RECORD	MNEMONIC USED BY TART	DESCRIPTION	NOTES
B1	ITITL IRMRK	No. of words in title No. of words in RMRK	1
B2	ITITLE > 0 TITLE (I), I = 1, ITITL	Array containing the title (one character per word)	
B3	IRMRK > 0 RMRK (I), I = 1, IRMRK	Array containing remarks (one character per word)	
R1	IPVR(I), I = 1,3 IEQR IPRTR IF1R IF2R	Subsystem, equipment, port packed ID's Receptor equipment index Receptor port index Lowest frequency pointer for receptor Highest frequency pointer for receptor	2
R2	NFQR	Number of frequencies for receptor	3
R3	FQTR(I), I=1, NFQR FQTDBR(I), I=1, NFQR	Receptor frequency table (Hz) Receptor frequency table (dB Hz)	3
E1	IPVE(I), I=1,3 IEQE IPRTE	Subsystem, equipment, port packed ID's Emitter equipment index Emitter port index	4
E2	NFQE	Number of emitter frequencies	5
E3	FQTE(I), I=1, NFQE FQTDBE(I), I=1, NFQE	Emitter frequency table (Hz) Emitter frequency table (dB Hz)	5

NOTES:

1. This block, B1, represents the first logical record in the Baseline Transfer File. The first three records (B1, B2, B3) are not repeated.

2. Parameters set to 999 for END-OF-FILE.

3. Records R2 and R3 exist only after the first port in RCPT EQPT.

4. Parameters set to 999 for end-of EMTRS for given RCPT.

5. Records E2 and E3 exist only after the first port in EMTR EQPT.

TABLE 157 (Concluded)

RECORD	MNEMONIC USED BY TART	DESCRIPTION	NOTES
E4	IPATH IF1CE IF2CE IF1CR IF2CR EMMX EMINP	Coupling path code (1-7) Lowest common emitter frequency pointer Highest common emitter frequency pointer Lowest common receptor frequency pointer Highest common receptor frequency pointer Maximum EMI margin for port pair Integrated EMI margin for port pair	
E5	TRNSFE(I), I=IF1CE, IF2CE TRNSFR(I), I=IF1CR, IF2CR ((EMSE(IB,I), IB=1,2), I=IF1CE, IF2CE) ((EMSR(IB,I),IB=1,2), I=IF1CR, IF2CR) RSIGM(I), I=IF1CR, IF2CR	Transfer function at emitter frequencies Transfer function at receptor frequencies EMI margins at emitter frequencies EMI margins at receptor frequencies Received signal due to this emitter at receptor frequencies	
(Records E1-E5 repeated for all EMTRS coupled to RCPT)			
	999	END-OF-EMTRS for receptor	
R4	RSIGEF(I) I=IF1R, NEFQ2>0 IF2R	Received signal due to environmental fields at receptor frequencies	
R5	EMMX EMINT RSIGT(I), I=IF1R, IF2R EMS(I), I=IF1R, IF2R	Maximum EMI margin Integrated EMI margin from total signal Total received signal at receptor frequencies	
(Records R1 through R5 repeated for all RCPT ports)			
	999	End of receptors	

TABLE 158

SGR SCRATCH FILE

MNEMONIC USED BY TART	DESCRIPTION	NOTES
SBIDE(I), I=1,5	Unpacked Subsystem ID	
EIDE(I), I=1,5	Unpacked Equipment ID	
PIDE(I), I=1,5	Unpacked Port ID	
IPVE(I), I=1,3	Subsystem, Equipment, port packed ID's	
IEQE	Emitter equipment index	
IPRTE	Emitter port index	
IPATH	Coupling path code (1-7)	
NFQE	Number of emitter frequencies	
IF1E	Lowest emitter frequency pointer	
IF2E	Highest emitter frequency pointer	
IF1CE	Lowest common emitter frequency pointer	
IF2CE	Highest common emitter freqeuncy pointer	
IF1CR	Lowest common receptor frequency pointer	
IF2CR	Highest common receptor frequency pointer	
RFR1E	Lowest required emtr frequency index	
RFR2E	Highest required emtr frequency index	
BWCE	Equivalent bandwidth for emitter	
(TRNSFR(I), I=IF1CR, IF2CR)	Transfer function at receptor frequencies	
(TRNSFE(I), I=IF1CE, IF2CE)	Transfer function at emitter frequencies	
((SPE(I,J), I=1,2), J=IF1E, IF2E)	Emitter Spectra	
((SPELIM(I,J), I=1,2), J=IF1E, IF2E)	Emitter Spectra Adjust Limit	
(FQTE(I),I=1, NFQE)	Emitter frequency table (Hz)	
(FQTDBE(I),I=1, NFQE)	Emitter frequency table (dB Hz)	

(Above two records, each block representing a record, are repeated for all coupled EMTR ports)

TABLE 159

SCRATCH TRANSFER FILE

RECORD	MNEMONIC USED BY TART	DESCRIPTION	NOTES
R1	NFQR	Number of receptor frequencies	
R2	FQTR(I), I=1, NFQR FQTDBR(I), I=1, NFQR	Receptor frequency table (Hz) Receptor freqeuncy table (dB Hz)	
E1	SBIDE(I), I=1,5 EIDE(I), I=1,5 PIDE(I), I=1,5 IEQE IPRTE IPATH IF1CE IF2CE IF1CR IF2CR	Unpacked subsystem ID Unpacked equipment ID Unpacked port ID Emitter equipment index Emitter port index Coupling path code (1-7) Lowest common emitter frequency pointer Highest common emitter frequency pointer Lowest common receptor frequency pointer Highest common receptor frequency pointer	
E2	NFQE	Number of emitter frequencies	
E3	FQTE(I), I=1, NFQE FQTDBE(I), I=1, NFQE	Emitter freqeuncy table (Hz) Emitter frequency table (dB Hz)	
(Records E1 through E3 repeated for all EMTRS coupled to RCPT)			
R3	RSIGEF(1), I = IF1R, IF2R	Received signal from environmental field	

(Following record R3, the format is repeated for each receptor port)

Section 7

IEMCAP PRINTED OUTPUT

7.1 IDIPR PRINTED OUTPUT

The printed output from IDIPR falls into the following categories:

7.1.1 Error Messages

During Input Decode, if errors are found in the data, an appropriate error message is printed with the data card, as illustrated in Figure . Additional error messages are printed during Initial Processing if errors are encountered during file updating or in generating initial spectra.

FIGURE 7. EXAMPLES OF INPUT DECODE ERROR MESSAGES

```
***CARD NO.      25
PORT=AIDOT,WIRE,(BNDL2,B2W2,A2,GND,GND,NOTEX),50,0,0,0
***ERROR NO.      4
*****NO. PARAMETERS INCORRECT
***THIS CARD WILL BE DELETED***
SOURCE=SIGNAL,3..,20.E3,4.E8,RECTPL(20.E3,1.E-6),10,VLTS,4.E6
----------------$
***CARD NO.      26
SOURCE=SIGNAL,3..,20.E3,4.E6,RECTPL(20.E3,1.E-6),10,VLTS,4.E6
***ERROR NO.      5
*****ILLEGAL SYNTAX
***THIS CARD WILL BE DELETED***
```

7.1.2 Input Data Card Image

At the end of Input Decode, a list of all input cards read is printed.

7.1.3 Intrasystem Signature File Report

During Initial Processing, a report of all the data that comprises the system for which the analysis task is to be performed is printed. As this data is also saved on the Intrasystem Signature File (ISF) generated by IDIPR, this report consists of a listing of the data on the new ISF. During Initial Processing, a report of the old ISF file, used as input to IDIPR, may optionally be printed. The ISF report consists of a printout of the system data, the equipment data, followed by the equipment's frequency table and initial spectra of each port of the equipment, and of the bundle data. The spectra printout for each port in the system consists of the initial emission (broadband and narrowband) spectra and receptor susceptibility levels dependent on their specification as a source and/or receptor. These levels are obtained from spectrum model synthesis of the input data and integrated to the equipment frequency table. If an old ISF is used that was written by a TART SGR run, and if no changes are made to the input data of the port, the spectra would be the adjusted spectra from the TART run, since initial spectra are computed only for new or modified ports. An example of an ISF report is given in Figure 8.

```
                                                                                          NEW ISF FILE
                                                                                          ************

SUBSYSTEM
---------
ID= CNI


EQUIPMENT NO. IS    1
--------------------
ID               COMPARTMENT
                                 WATER      BUTT       FUSELAGE       SPEC       FIXADJ      CLASS
                    NO.          LINE       LINE       STATION

-----------------------------------------------------------------------------------------------
UHFCO               AFCTR        21.5       23.0       180.0          M4          AD          NO

LO. FREQ=   .3000000E+02     HI. FREQ. =   .1800000E+11     NO. FREQ. PER OCTAVE=   1   MAX. NO. OF FREQS=.   35


PORTS
-----
INDX ID         CONNECT.     SO/RC          FILTER   TERM.             CAPACIT.   INDUCTION            SPECT. DISP
                CODE                        ID       RESIST.                      SUBPARAMETERS           SO              RC
-------------------------------------------------------------------------------------------------------------------------

  1   CASE      CASE         BOTH                                                                 0.              0.

  2   COMLO     ANT          BOTH           FLTR2    .50000000E+02   0.                0.         0.              0.
                AID=COMTA    THETA=   0.             PHI=   0.            LOC COORD=   0.      ,  0.          ,   .86000E+02  WGLOC=NO

  3   COMUP     ANT          BOTH           FLTR1    .50000000E+02   0.                0.         0.              0.
                AID=COMTA    THETA=   0.             PHI=   0.            LOC COORD=   0.      ,  .15500E+03,     .62500E+03  WGLOC=NO

  4   ADFIN     ANT          RCPT                    .50000000E+02   0.                0.         0.              0.
                AID=CMADF    THETA=   0.             PHI=   0.            LOC COORD=   0.      ,  0.          ,   .12900E+03  WGLOC=NO

  5   PWRSP     WIRE         BOTH                    .50000000E+00   0.                0.         0.              0.
                                  BNDL ID=BNDL1      WIRE ID=91W1    PT ID=A1     REFWIRE=GND     SH. TERM=NO     APEXP=EX

  6   AIDGT     WIRE         EMTR                    .50000000E+02   0.                0.         0.              0.
                                  BNDL ID=BNDL2      WIRE ID=P2W2    PT ID=A2     REFWIRE=GND     SH. TERM=NO     APEXP=NO

  7   PYCON     WIRE         BOTH                    .50000000E+02   0.                0.         0.              0.
                                  BNDL ID=BNDL2      WIRE ID=P2W1    PT ID=A2     REFWIRE=GND     SH. TERM=GN     APEXP=EX
```

FIGURE 8
SAMPLE REPORT OF INTRASYSTEM SIGNATURE FILE
(Part 1 of 4)

```
EMITTERS  AND RECEPTORS
----------------------

INDX RCPT ID              SR CODE    ADJLIM         NSPEC    BASPEC
----------------------------------------------------------------------
 1   CASE       SPCE        CASE   .3000000E+02      MIL      SPEC
      99=    .1000000E+03   .2750000E+02   .1000000E+06   .2750000E+02   .2500000E+08   .5250000E+02   .1000000E+09   .2500000E+02
             .1000000E+10  -.2460000E+02

 1   CASE       RCPT        CASE   .1000000E+02      MIL      MIL

INDX RCPT ID              SR CODE  ADJLIM    LOW F.     HI F      MAX P/S/A  UNIT IF A  BWC      MOD/SIG  PTYP/SIG     FIF
-----------------------------------------------------------------------------------------------------------------------
 2   COMLO    SPCE    RF     .30000E+02  .22500E+09  .39990E+09  .10000E+03          .50000E+05    AM      VO
    B=   .5000000E+04      EM=   .1000000E+01
     HARM.=  -.5000000E+02  -.1000000E+03

 2   COMLO    RCPT    RF     .30000E+02  .22500E+09  .39990E+09 -.10000E+03          .50000E+05    AM      VO        .10000E+07
    B=   .5000000E+04      EM=  0.

 3   COMUP    SPCE    RF     .30000E+02  .22500E+09  .39990E+09  .10000E+03          .50000E+05    AM      VO
    B=   .5000000E+04      EM=   .1000000E+01
     HARM.=  -.5000000E+02  -.1000000E+03

 3   COMUP    RCPT    RF     .30000E+02  .22500E+09  .39990E+09 -.10000E+03          .50000E+05    AM      VO        .10000E+07
    B=   .5000000E+04      EM=  0.

 4   ADFIN    RCPT    RF     .30000E+02  .22500E+09  .39990E+09 -.10000E+03          .50000E+05    AM      VO        .10000E+07
    B=   .5000000E+04      EM=  0.

INDX RCPT ID              SR CODE  ADJLIM       VOLTAGE        FREQ          HI.HARM. NO.PHASES. RS CODE
-------------------------------------------------------------------------------------------------------
 5   PWRSP    SPCE      PWR    .3000000E+02   .1150000E+03   .4000000E+03        2          1        M4
 5   PWRSP    RCPT      PWR    .3600000E+02   .1150000E+03   .4000000E+03        2          1        M4
```

FIGURE 8 (Continued)
SAMPLE REPORT OF INTRASYSTEM SIGNATURE FILE
(Part 2 of 4)

NEW ISF FILE
****

BUNDLE 1

ID:BNDL1

NODE POINTS:

NODE	X	Y	Z
A1	5.0	65.0	100.0
B1	0.0	80.0	370.4
C1	-5.0	90.0	400.0

BUNDLE SEGMENTS:

POINT 1	POINT 2	CMPT	APERTURE	LENGTH	HEIGHT
A1	B1	COMP1	TOPCP	270.9	4.0
B1	C1	COMP1		32.0	4.0

WIRES:

ID	W.C.T. TYPE	POINTS:		
B1W1	SPC22	A1	B1	C1
B1W2	SPCS2	B1	C1	

FIGURE 8 (Continued)
SAMPLE REPORT OF INTRASYSTEM SIGNATURE FILE
(Part 3 of 4)

NEW ISF FILE

I N I T I A L   P O R T   S P E C T R A

SUBS = CNI   EQPT 1 = UHFCO PORT 2 = PYCON

IFRQ	FREQUENCY	EMITTER				RECEPTOR	
		N9 SPECT	N9 LIMIT	BB SPECT	BB LIMIT	SPECT	LIMIT
1	.3000E+02	130.0	100.0	132.0	102.0	86.0	116.0
2	.6000E+02	130.0	100.0	132.0	102.0	86.0	116.0
3	.1200E+03	130.0	100.0	132.0	102.0	86.0	116.0
4	.2400E+03	130.0	100.0	132.0	102.0	86.0	116.0
5	.4800E+03	130.0	100.0	132.0	102.0	86.0	116.0
6	.9600E+03	130.0	100.0	132.0	102.0	86.0	116.0
7	.1920E+04	130.0	100.0	132.0	102.0	86.0	116.0
8	.3840E+04	122.1	92.1	132.0	102.0	86.0	116.0
9	.7680E+04	107.0	77.0	132.0	102.0	86.0	116.0
10	.1536E+05	-1034.0	-1064.0	107.9	77.9	86.0	116.0
11	.3072E+05	-1034.0	-1064.0	101.8	71.8	86.0	116.0
12	.6144E+05	-1034.0	-1064.0	95.8	65.8	86.0	116.0
13	.1229E+06	-1034.0	-1064.0	89.8	59.8	86.0	116.0
14	.2458E+06	-1034.0	-1064.0	83.8	53.8	86.0	116.0
15	.4915E+06	-1034.0	-1064.0	77.8	47.8	86.0	116.0
16	.9830E+06	-1034.0	-1064.0	71.7	41.7	86.0	116.0
17	.1966E+07	-1034.0	-1064.0	65.7	35.7	86.0	116.0
18	.3932E+07	-1034.0	-1064.0	59.7	29.7	86.0	116.0
19	.7864E+07	20.0	-10.0	50.0	20.0	103.0	133.0
20	.1573E+08	20.0	-10.0	50.0	20.0	103.0	133.0
21	.3146E+08	20.0	-10.0	50.0	20.0	103.0	133.0
22	.6291E+08	20.0	-10.0	50.0	20.0	103.0	133.0
23	.1258E+09	0.0	0.0	0.0	0.0	103.0	133.0
24	.2517E+09	0.0	0.0	0.0	0.0	103.0	133.0
25	.5033E+09	0.0	0.0	0.0	0.0	103.0	133.0
26	.1007E+10	0.0	0.0	0.0	0.0	103.0	133.0
27	.2013E+10	0.0	0.0	0.0	0.0	103.0	133.0
28	.4027E+10	0.0	0.0	0.0	0.0	103.0	133.0
29	.8053E+10	0.0	0.0	0.0	0.0	103.0	133.0
30	.1611E+11	0.0	0.0	0.0	0.0	103.0	133.0

FIGURE 8 (Concluded)
SAMPLE REPORT OF INTRASYSTEM SIGNATURE FILE
(Part 4 of 4)

7.1.4 Debug Printout

An option is available that, if used in conjunction with a source listing, would print internal flags and messages to aid in debugging.

7.2 TART PRINTED OUTPUT

The Task Analysis Routine (TART) printouts are summaries of EMI margins between emitter-receptor port pairs and total received signal from all emitters into each receptor. For EMC specification generation (SGR) runs, summaries of emitter and receptor spectrum adjustments are also printed. Optionally, the user may request supplemental printouts which provide detailed transfer model outputs. These outputs are described below in relation to the four TART analysis tasks.

7.2.1 EMC Specification Generation Outputs

The Specification Generation Routine (SGR) outputs are provided for the three SGR phases: emitter spectrum adjustment, receptor adjustment, and unresolved EMI. After these, the finally adjusted spectra are summarized for each port.

7.2.1.1 Emitter Spectrum Adjustment Summary - A sample emitter adjustment summary printout is shown in Figure 9. In this, as well as all other emitter-receptor pair summaries, entries are listed by ascending frequency from both the emitter and receptor frequency tables. Hence, the first column gives the frequency, the second gives the base (i.e., EMTR or RCPT frequency table) from which that frequency was taken. In the third column the letters "REQD" are printed if the frequency is within the emitter's required output frequency range. The transfer ratio in dB, which is printed next, includes all transfer from the emitter port generator to the receptor port load, including filters, antenna gains, propagation loss, inter-wire coupling, etc.

The next series of output columns give narrowband (discrete) and broadband (continuous) emitter spectrum and EMI margin data after adjustment in conjunction with the receptor. The EMI margin and received signal level are printed at both emitter and receptor frequencies, while the adjusted emitter spectrum level, the amount of spectrum adjustment, the relation to the present spectrum level and the adjustment limit are printed at emitter frequencies only. In addition, the bandwidth factor in dB is printed for broadband. If at a given frequency a broadband or narrowband margin is below -900 dB, it is not printed. These result from emitter spectra at -1000 dB (no emission) and receptor spectra at +1000 dB (no response).

The adjusted margins are received signals at the receptor frequencies computed by interpolation between the emitter frequencies on either side. Hence, if one of these emitter points is -1000 dB, the interpolated signal will be between -1000 and the next emitter point. Such outputs should be ignored.

A D J U S T E D   E M I T T E R   S P E C T R A

EMTR -- SUBS = CNI   EQPT 5 = TACAN   PORT 2 = TACRF

RCPT -- SUBS = INGPD   EQPT 6 = OBPYL   PORT 4 = OBOR

PATH = ANT TO ANT

FREQUENCY (HERTZ)	FREQ BASE	TRANSFER RATIO	NARROWBAND ADJSTD EMI MGN	NARROWBAND RCVD SIGNAL	NARROWBAND ADJ EMTR SPCT LEV	NARROWBAND ADJMT AMOUNT	NARROWBAND SPCT LEV TO LIMIT	BROADBAND ADJSTD EMI MGN	BROADBAND RCVD SIGNAL	BROADBAND ADJ EMTR SPCT LEV	BROADBAND ADJMT AMOUNT	BROADBAND SPCT LEV TO LIMIT	BDWTH FCTR
1.19689E+04	EMTR	0.0	-94.0	6.0	6.0	0.0	30.0	-98.4	1.6	26.0	0.0	30.0	-24.4
2.03602E+04	RCPT	0.0	-94.0	6.0				-96.1	3.9				-22.1
2.53030E+04	EMTR	0.0	-94.0	6.0	6.0	0.0	30.0	-95.2	4.8	26.0	0.0	30.0	-21.2
3.90795E+04	RCPT	0.0	-94.0	6.0				-93.3	6.7				-19.3
5.24919E+04	EMTR	0.0	-94.0	6.0	6.0	0.0	30.0	-96.7	3.3	26.0	0.0	30.0	-22.7
7.50093E+04	RCPT	0.0	-94.0	6.0				-95.2	4.8				-21.2
1.13885E+05	EMTR	0.0	-94.0	6.0	6.0	0.0	30.0	-93.4	6.5	26.0	0.0	30.0	-19.5
1.43973E+05	RCPT	0.0	-94.0	6.0				-92.4	7.6				-18.4
2.39068E+05	EMTR	0.0	-94.0	6.0	6.0	0.0	30.0	-90.2	9.8	26.0	0.0	30.0	-16.2
2.76342E+05	RCPT	0.0	-96.1	3.9				-95.4	4.6				-15.6
5.05444E+05	EMTR	0.0	-34.1	-5.2	-5.2	-11.2	18.8	-28.1	.8	-4.0	-30.0	0.0	4.8
5.30413E+05	RCPT	0.0	-28.4	-5.2				-22.4	.8				4.8
1.00000E+06	RCPT	0.0	-10.4	-5.2				-4.4	.8				4.8
1.01803E+06	RCPT	0.0	-10.4	-5.2				-4.4	.8				4.8
1.06845E+06	EMTR	0.0	-10.4	-5.2	-5.2	-11.2	18.8	-4.4	.8	-4.0	-30.0	0.0	4.8
1.95410E+06	RCPT	0.0	-15.3	-10.1				-4.4	.8				4.8
2.25877E+06	EMTR	0.0	-16.5	-11.3	-11.3	-17.3	12.7	-4.4	.8	-4.0	-30.0	0.0	4.8
3.75070E+06	RCPT	0.0	-9.9	-4.7				-4.4	.8				4.8
4.00000E+06	RCPT	0.0	-9.0	-3.8				-4.4	.8				4.8
4.77517E+06	EMTR	0.0	-43.7	-1.5	-1.5	-7.5	22.5	-41.4	.8	-4.0	-30.0	0.0	4.8
5.09800E+06	RCPT	0.0	-52.8	-1.0				-49.2	2.6				4.8
7.19910E+06	RCPT	0.0	-97.4	2.6				-90.5	9.5				-3.0
1.00950E+07	EMTR	-2.3	-96.2	3.8	6.0	0.0	30.0	-79.2	20.8	26.0	0.0	30.0	-3.8
1.38180E+07	RCPT	-5.5	-99.5	.5				-81.1	18.9				-1.6
2.13414E+07	EMTR	-11.3	-105.3	-5.3	6.0	0.0	30.0	-85.0	15.0	26.0	0.0	30.0	.3
2.65223E+07	RCPT	-14.2	-108.2	-8.2				-87.0	13.0				1.2
4.51169E+07	EMTR	-21.3	-115.3	-15.3	6.0	0.0	30.0	-91.7	8.3	26.0	0.0	30.0	3.5
5.09069E+07	RCPT	-22.9	-116.9	-16.9				-92.8	7.2				4.1
9.53796E+07	EMTR	-31.4	-125.4	-25.4	6.0	0.0	30.0	-98.6	1.4	26.0	0.0	30.0	6.8
9.77103E+07	RCPT	-31.7	-125.7	-25.7				-98.8	1.2				6.9
1.87547E+08	RCPT	-40.6	-134.6	-34.6				-107.9	-7.9				6.7
2.01638E+08	EMTR	-41.6	-135.6	-35.6	6.0	0.0	30.0	-108.6	-8.6	26.0	0.0	30.0	7.0
3.59978E+08	RCPT	-49.7	-143.7	-43.7				-114.2	-14.2				9.5
4.26274E+08	EMTR	-52.1	-146.1	-46.1	6.0	0.0	30.0	-115.8	-15.8	26.0	0.0	30.0	10.3
6.98942E+08	RCPT	-59.0	-153.0	-53.0				-120.6	-20.6				12.4
8.00000E+08	EMTR	-61.1	-155.1	-55.1	6.0	0.0	30.0	-122.1	-22.1	26.0	0.0	30.0	13.0
9.01168E+08	EMTR	-62.9	-156.9	-56.9	6.0	0.0	30.0	-123.3	-23.3	26.0	0.0	30.0	13.5
9.62000E+08	EMTR	-63.8	-157.8	-57.8	6.0	0.0	30.0	-124.0	-24.0	26.0	0.0	30.0	13.8
1.02500E+09	EMTR REQD	-64.8	-30.0	70.0	134.8	0.0	30.0	-71.3	28.7	97.5	0.0	30.0	-4.0
1.13000E+09	EMTR REQD	-66.2	-31.4	68.6	134.8	0.0	30.0	-72.7	27.3	97.5	0.0	30.0	-4.[illegible]
1.21300E+09	EMTR	-67.3	-161.3	-61.3	6.0	0.0	30.0						
1.28000E+09	EMTR	-68.1	-162.1	-62.1	6.0	0.0	30.0						

FIGURE 9
SAMPLE OUTPUT - SGR EMITTER SPECTRUM ADJUSTMENT
(Part 1 of 2)

A D J U S T E D   E M I T T E R   S P E C T R A

EMTR -- SUBS = CNI   EQPT 5 = TACAN PORT 2 = TACPF

RCPT -- SUBS = IMGPD EQPT 8 = ORPTL PORT 4 = OBOP

PATH = ANT TO ANT

(CONTD)

FREQUENCY (HERTZ)	FREQ BASE	TRANSFER RATIO	NARROWBAND ADJSTD EMI MGN	NARROWBAND RCVD SIGNAL	NARROWBAND ADJ EMTR SPCT LEV	NARROWBAND ADJMT AMOUNT	NARROWBAND SPCT LEV TO LIMIT	BROADBAND ADJSTD EMI MGN	BROADBAND RCVD SIGNAL	BROADBAND ADJ EMTR SPCT LEV	BROADBAND ADJMT AMOUNT	BROADBAND SPCT LEV TO LIMIT	BDWTH FCTR
1.32620E+09	RCPT PFOO	-68.6	-162.6	-62.6									
1.39000E+09	EMTR	-69.2	-163.2	-63.2	6.0	0.0	30.0						
1.99512E+09	EMTR	-74.1	-99.3	.7	74.8	0.0	30.0	-123.3	-23.8	37.5	0.0	30.0	12.8
2.54551E+09	RCPT	-78.6	-111.6	-11.6				-134.8	-34.9				14.1
~~4.02763E+09~~	~~EMTR~~	-86.9	-131.2	-31.2	54.8	0.0	30.0	-152.4	-52.4	17.5	0.0	30.0	16.1
4.88585E+09	RCPT	-89.1	-146.9	-46.9				-417.3	-317.3				15.3
8.51443E+09	EMTR	-98.7	-192.6	-92.6	6.0	0.0	30.0						
9.37792E+09	RCPT	-100.4	-194.3	-94.3									
1.88000E+10	RCPT	-112.5	-206.5	-106.5									

INTEGRATED EMT MARGIN = -.9

FIGURE 9 (Concluded)
SAMPLE OUTPUT - SGR EMITTER SPECTRUM ADJUSTMENT
(Part 2 of 2)

7.2.1.2 Receptor Spectrum Adjustment Summary - The receptors are adjusted after each emitter has been adjusted in conjunction with each receptor. This receptor adjustment is made in conjunction with the total received signal from all emitters coupled to the given receptor. SGR prints a summary of this as illustrated in Figure 10. The frequency is printed first, followed by "REQD" if the frequency is within the receptor's required frequency range. Next, the adjusted EMI margins to the total signal, the total signal level, and the adjusted receptor spectrum susceptibility level are printed. The amount of adjustment and the relation to the adjustment limit of the receptor spectrum are also printed.

7.2.1.3 Unresolved Interference Summary - After a given receptor port has been adjusted, SGR scans through the emitters coupled to it and computes the new margins. If the maximum margin exceeds the user supplied printout limit, a summary is printed as illustrated in Figure 11.

The outputs in this summary are similar to those for the Emitter Spectrum Adjustment Summary without the adjustment data. The frequency base, and transfer ratio are printed as before. The receptor spectrum level at the receptor frequencies and the interpolated values at the emitter frequencies (identified by an "I") are printed. If the frequency is within the receptor frequency range, an "R" is printed also. At each receptor frequency, the relation of the receptor spectrum level to the adjustment limit is printed next.

Following the receptor outputs, the EMI margin, emitter spectrum level, relation of the emitter spectrum to the adjustment limit, and the received signal level are printed for the narrowband and broadband emitter spectrum components. The interpolated emitter spectrum values are identified by an "I", and the required emitter spectrum points are identified by an "R" next to the emitter spectrum level. For broadband, the bandwidth factor, in dB, is also printed.

7.2.1.4 Finally Adjusted Port Spectra - After all of the spectra have been adjusted and all unresolved interface has been determined and printed, the adjusted spectra for each port are printed. The format is identical to that of the initial port spectra outputs (See Section 6.4.3).

7.2.2 Baseline System EMC Survey Outputs

For each case with maximum EMI margin exceeding the user printout limit, CEAR prints a summary, as shown in Figure 12. The format is identical to that of the SGR Unresolved Resolved EMI Summary, except that the relation of the emitter and receptor spectra to their adjustment limits are not printed since there are no adjustments in this analysis. The above discussion for the SGR output regarding erroneous values due to interpolation with one spectrum point at -1000 dB also applies here.

An output is also printed giving the margins to the total received signal, and an example of such output is shown in Figure 13. The format is similar to the SGR Receptor Spectrum Adjustment Summary, except that no adjustment data is printed.

A D J U S T E D   R E C E P T O R   S P E C T R U M

SUBS = CNT   PORT 6 = TFF   PORT 2 = TFFOF

FREQUENCY (HERTZ)		ADJUSTD EMI MGN	RCVD SIGNAL	ADJUSTED SPECTRUM	ADJMT AMOUNT	SPCT LEV TO LIMIT
8.83032E+03		-56.3	46.7	103.0	0.0	30.0
1.66071E+04		-56.3	46.7	103.0	0.0	30.0
3.12328E+04		-55.3	46.7	103.0	0.0	30.0
5.87392E+04		-56.3	46.7	103.0	0.0	30.0
1.10470E+05		-56.3	46.7	103.0	0.0	30.0
2.07760E+05		-56.4	46.7	103.0	0.0	30.0
3.90733E+05		-6.0	97.2	103.2	.2	29.8
7.34847E+05		12.1	145.1	133.0	30.0	0.0
1.38202E+06		12.2	145.2	133.0	30.0	0.0
2.59915E+06		12.1	145.1	133.0	30.0	0.0
4.88828E+06		11.1	144.1	133.0	30.0	0.0
9.19318E+06		-30.0	73.0	103.0	0.0	30.0
1.72895E+07		-47.2	55.8	103.0	0.0	30.0
3.25162E+07		-65.1	37.9	103.0	0.0	30.0
6.11530E+07		-72.9	30.2	103.0	0.0	30.0
1.15010E+08		-81.2	21.8	103.0	0.0	30.0
2.16298E+08		-43.2	59.8	103.0	0.0	30.0
4.06789E+08		-50.7	52.3	103.0	0.0	30.0
7.65044E+08		-68.8	34.2	103.0	0.0	30.0
1.03000E+09	9500	31.8	54.8	23.0	0.0	30.0
1.09000E+09		-48.8	54.2	103.0	0.0	30.0
1.43881E+09		-113.3	-10.3	103.0	0.0	30.0
2.70596E+09		-125.3	-22.3	103.0	0.0	30.0
5.08907E+09		-77.5	25.5	103.0	0.0	30.0
9.57096E+09		-144.3	-41.3	103.0	0.0	30.0
1.80000E+10		-166.3	-63.3	103.0	0.0	30.0

FIGURE 10

SAMPLE OUTPUT - SGR RECEPTOR SPECTRUM ADJUSTMENT

U N R E S O L V E D   I N T E R F E R E N C E

EMTR -- SLBS = CNT   EQPT 1 = UHFCO   PORT 2 = COMLO

RCPT -- SLBS = CNT   EQPT 6 = IFF   PORT 2 = IFFRF

PATH = ANT TO ANT

NOTE - R = IN REQD RANGE, I = INTERPOLATED VALUE

					NARROWBAND				BROADBAND				
FREQUENCY (HERTZ)	FREQ BASE	TRANSFER RATIO	RECEPTOR SPCT LEV	RCPT LEV TO LIMIT	EMI MARGIN	EMITTER SPEC LEV	EMTR LEV TO LIMIT	RCVD SIGNAL	EMI MARGIN	EMITTER SPEC LEV	EMTR LEV TO LIMIT	RCVD SIGNAL	BWTH FCTR
1.53600E+04	EMTR	-8.0	103.0 I		-69.0	43.0	30.0	35.0					
1.65071E+04	RCPT	-8.0	103.0	30.0	-68.0	43.0 I		35.0					
3.07200E+04	EMTR	-8.1	103.0 I		-68.1	43.0	30.0	34.9					
3.12328E+04	RCPT	-8.1	103.0	30.0	-68.1	43.0 I		34.9					
5.47392E+04	RCPT	-8.2	103.0	30.0	-68.2	43.0 I		34.8					
6.14400E+04	EMTR	-8.2	103.0 I		-68.2	43.0	30.0	34.8					
1.19470E+05	RCPT	-8.4	103.0	30.0	-68.4	43.0 I		34.6					
1.22880E+05	EMTR	-8.4	103.0 I		-68.4	43.0	30.0	34.6					
2.07760E+05	RCPT	-8.7	103.0	30.0	-68.7	43.0 I		34.3					
2.45760E+05	EMTR	-8.7	103.1 I		-68.8	43.0	30.0	34.3					
3.90733E+05	RCPT	-9.0	103.2	29.8	-79.6	32.7 I		23.7					
4.91520E+05	EMTR	-9.2	114.1 I		-95.7	27.6	14.5	18.4					
7.34847E+05	RCPT	-9.5	133.0	0.0	-123.4	19.1 I		9.6					
9.83040E+05	EMTR	-9.8	133.0 I		-129.6	13.0	0.0	3.2					
1.38232E+06	RCPT	-10.2	133.0	0.0	-130.2	13.0 I		2.9					
1.96608E+06	EMTR	-10.6	133.0 I		-130.6	13.0	0.0	2.4					
2.59915E+06	RCPT	-11.0	133.0	0.0	-131.0	13.0 I		2.0					
3.93216E+06	EMTR	-11.8	133.0 I		-131.8	13.0	0.0	1.2					
4.88820E+06	RCPT	-12.3	133.0	0.0	-132.3	13.0 I		.8					
7.86432E+06	EMTR	-15.1	110.4 I		-112.5	13.0	0.0	-2.0					
9.19318E+06	RCPT	-16.9	103.0	30.0	-100.1	19.8 I		2.9					
1.57286E+07	EMTR	-23.3	103.0 I		-83.3	43.0	30.0	19.7					
1.72895E+07	RCPT	-24.5	103.0	30.0	-84.5	43.0 I		18.5					
3.14573E+07	EMTR	-32.5	103.0 I		-92.5	43.0	30.0	10.5					
3.25162E+07	RCPT	-32.9	103.0	30.0	-92.9	43.0 I		10.1					
5.11530E+07	RCPT	-42.3	103.0	30.0	-102.3	43.0 I		.7					
6.29146E+07	EMTR	-42.7	103.0 I		-102.7	43.0	30.0	.3					
1.15010E+08	RCPT	-52.8	103.0	30.0	-112.8	43.0 I		-9.8					
1.25829E+08	EMTR	-54.4	103.0 I		-114.4	43.0	30.0	-11.4					
2.16298E+08	RCPT	-54.6	103.0	30.0	-62.1	105.5 IR		40.9	-232.9	-112.2 IR		-183.9	-13.0
2.51658E+08	EMTR	-67.7	103.0 I		-47.7	123.0 R	30.0	55.3	-47.9	137.9 R	30.0	55.2	-13.0
4.05789E+08	RCPT	-78.1	103.0	30.0	-58.1	123.0 IR		44.9	-58.3	135.9 IR		44.8	-13.0
5.03316E+08	EMTR	-83.0	103.0 I		-63.0	123.0 R	30.0	40.0	-63.2	135.9 R	30.0	39.8	-13.0
7.65044E+08	RCPT	-94.0	103.0	30.0	-104.2	92.8 I		-1.2	-78.5	103.7 I		24.5	12.8
1.00663E+09	EMTR	-101.8	29.2 IR		-58.0	73.0	30.0	-28.8	-36.7	95.9	30.0	-7.5	8.5
1.13000E+09	RCPT	-102.5	23.0 R	30.0	-53.5	72.0 I		-30.5	-67.1	43.9 I		-44.1	8.5
1.69008E+09	RCPT	-104.2	103.0	30.0	-137.7	69.6 I		-34.6	-235.6	-38.8 I		-132.6	10.4
1.43881E+09	RCPT	-112.9	103.0	30.0	-158.3	57.6 I		-55.3	[illegible]	-473.7 I		-575.0	11.6
2.01327E+09	EMTR	-124.1	103.0 I		-184.1	43.0	30.0	-81.1					
2.70596E+09	RCPT	-134.6	103.0	30.0	-194.6	43.0 I		-91.4					
4.02653E+09	EMTR	-149.7	103.0 I		-209.7	43.0	30.0	-106.7					
5.08907E+09	RCPT	-159.1	103.0	30.0	-219.1	43.0 I		-116.1					

FIGURE 11
SAMPLE OUTPUT - SGR UNRESOLVED INTERFERENCE
(Part 1 of 2)

U N R E S O L V E D   I N T E R F E R E N C E

EMTR -- SUBS = CNI   EQPT 1 = UHFCC   PORT 2 = COMLO

RCPT -- SUBS = CNI   EQPT 6 = IFF   PORT 2 = IFFRF

PATH = ANT TO ANT

(CONTD)

NOTE - R = IN REQD RANGE, I = INTERPOLATED VALUE

					NARROWBAND				BROADBAND				
FREQUENCY (HERTZ)	FREQ BASE	TRANSFER RATIO	RECEPTOR SPCT LEV	RCPT LEV TO LIMIT	EMI MARGIN	EMITTER SPEC LEV	EMTR LEV TO LIMIT	RCVD SIGNAL	EMI MARGIN	EMITTER SPEC LEV	EMTR LEV TO LIMIT	RCVD SIGNAL	BDWTH FCTR
8.05306E+09	EMTR	[illegible]	103.0 I		-238.5	43.0	30.0	-135.5					
9.57095E+09	RCPT	[illegible]	103.0	30.0	-246.0	43.0 I		-143.0					
~~1.41261E+10~~	EMTR	[illegible]	103.0 I		-269.5	43.0	30.0	-166.4					
1.80000E+10	RCPT	[illegible]	103.0	30.0	-274.5	43.0 I		-171.5					

[illegible] EMI MARGIN = -11.7

FIGURE 11 (Concluded)
SAMPLE OUTPUT - SGR UNRESOLVED INTERFERENCE
(Part 2 of 2)

BASELINE SYSTEM EMTR-RCPT PAIR INTERFERENCE

EMTR -- SUBS = IMGPD EQPT 4 = INPYL PORT 3 = IPAX (UNCHANGED)

RCPT -- SUBS = CNI EQPT 1 = UHFCO - PORT 2 = COMLO (UNCHANGED)

PATH = ANT TO ANT

NOTE - R = IN REQD RANGE, I = INTERPOLATED VALUE

FREQUENCY (HERTZ)	FREQ BASE	TRANSFER RATIO	RECEPTOR SUSC LEVEL	NARROWBAND EMI MARGIN	NARROWBAND RECEIVED SIGNAL	NARROWBAND EMITTER SPCT LEVEL	BROADBAND EMI MARGIN	BROADBAND RECEIVED SIGNAL	BROADBAND EMITTER SPCT LEVEL	BDWDTH FACTOR
1.06076E+04	EMTR	-186.0	103.0 I	-246.9	-143.8	42.1				
1.53600E+04	RCPT	-186.0	103.0	-246.9	-143.8	42.1 I				
~~2.03602E+04~~	~~EMTR~~	-186.0	103.0 I	-245.8	-143.6	42.1				
3.07200E+04	RCPT	-186.0	103.0	-246.8	-143.8	42.1 I				
3.98795E+04	EMTR	-186.0	103.0 I	-246.8	-143.8	42.1				
6.14400E+04	RCPT	-186.0	103.0	-246.8	-143.8	42.1 I				
7.50093E+04	EMTR	-181.0	103.0 I	-241.9	-138.9	42.1				
1.22880E+05	RCPT	-162.9	103.0	-223.8	-120.6	42.1 I				
~~1.43973E+05~~	~~EMTR~~	-158.4	103.0 I	-219.3	-116.2	42.1				
2.45760E+05	RCPT	-138.8	103.0	-199.7	-96.7	42.1 I				
2.76342E+05	EMTR	-135.7	103.0 I	-196.6	-93.6	42.1				
3.91520E+05	RCPT	-114.7	103.0				-295.8	-195.8	-21.0 IR	-60.0
5.30413E+05	EMTR	-113.4	103.0 I				-163.0	-65.0	108.4 R	-60.0
9.83040E+05	RCPT	-106.9	103.0	-97.6	5.4	112.3 IR	-127.6	-24.6	142.2 IR	-60.0
~~1.00000E+06~~	~~EMTR~~	-106.9	103.0 I	-66.8	36.2	143.1 R	-126.7	-23.7	143.2 R	-60.0
1.01808E+06	EMTR	-106.9	103.0 I	-66.7	36.3	143.1 R	-125.7	-23.7	143.2 R	-60.0
1.95410E+06	EMTR	-106.7	103.0 I	-66.6	36.4	143.1 R	-125.6	-23.6	143.2 R	-60.0
1.96608E+06	RCPT	-106.7	103.0	-66.6	36.4	143.1 IR	-126.6	-23.5	143.2 IR	-60.0
3.76070E+06	EMTR	-107.2	103.0 I	-67.1	35.9	143.1 R	-127.1	-24.1	143.2 R	-60.0
3.93216E+06	RCPT	-107.5	103.0	-67.4	35.6	143.1 IR	-127.3	-24.3	143.2 IR	-60.0
~~4.00000E+06~~	~~EMTR~~	-107.7	103.0 I	-67.6	35.4	143.1 R	-127.6	-24.6	143.2 R	-60.0
5.00000E+06	EMTR	-109.6	103.0 I				-213.4	-116.4	53.2 R	-60.0
7.19910E+06	EMTR	-112.4	103.0 I	-132.3	-29.2	83.1	-135.2	-32.2	83.2	-3.0
7.86432E+06	RCPT	-113.0	103.0	-135.5	-32.5	80.4 I	-138.2	-35.2	80.5 I	-2.5
1.38180E+07	EMTR	-117.2	103.0 I	-157.1	-54.1	63.1	-156.7	-53.7	63.2	-1.0
1.57286E+07	RCPT	-118.1	103.0	-162.1	-59.1	59.0 I	-370.1	-267.1	-146.0 I	-1.0
~~2.65223E+07~~	~~EMTR~~	-121.2	103.0 I	-182.1	-79.1	42.1				
3.14573E+07	RCPT	-121.9	103.0	-182.8	-79.8	42.1 I				
5.09069E+07	EMTR	-123.2	103.0 I	-184.1	-81.1	42.1				
6.29146E+07	RCPT	-122.5	103.0	-183.4	-80.4	42.1 I				
9.77109E+07	EMTR	-118.3	103.0 I	-179.1	-76.1	42.1				
1.25829E+08	RCPT	-105.5	103.0	-166.4	-63.4	42.1 I				
~~1.75547E+08~~	~~EMTR~~	-89.5	28.2 IR	-75.6	-47.4	42.1				
2.51658E+08	RCPT	-92.1	-27.0 R	-23.0	-49.9	42.1 I				
3.59978E+08	EMTR	-95.2	-27.0 IR	-26.1	-53.1	42.1				
5.03316E+08	RCPT	-98.1	-27.0 R	-29.0	-56.0	42.1 I				
6.50942E+08	EMTR	-132.5	32.4 I	-122.8	-90.4	42.1				
1.00663E+09	RCPT	-154.0	103.0	-214.9	-111.9	42.1 I				
~~1.32620E+09~~	~~EMTR~~	-160.5	103.0 I	-221.4	-118.3	42.1				
2.01327E+09	RCPT	-164.1	103.0	-225.0	-122.0	42.1 I				
2.54551E+09	EMTR	-166.1	103.0 I	-227.0	-124.0	42.1				
4.02653E+09	RCPT	-170.1	103.0	-231.0	-128.0	42.1 I				

FIGURE 12

SAMPLE OUTPUT - CEAR SURVEY PORT PAIR EMI SUMMARY

(Part 1 of 2)

BASELINE SYSTEM EMTR-RCPT PAIR INTERFERENCE

EMTR -- SUBS = IMGPD EQPT 4 = INPYL PORT 3 = IPAX (UNCHANGED)

RCPT -- SUBS = CNI EQPT 1 = UMFCO PORT 2 = COMLO (UNCHANGED)

PATH = ANT TO ANT (CONT D)

NOTE - R = IN REQD RANGE, I = INTERPOLATED VALUE

FREQUENCY (HERTZ)	FREQ BASE	TRANSFER RATIO	RECEPTOR SUSG LEVEL	NARROWBAND EMI MARGIN	NARROWBAND RECEIVED SIGNAL	NARROWBAND EMITTER SPCT LEVEL	BROADBAND EMI MARGIN	BROADBAND RECEIVED SIGNAL	BROADBAND EMITTER SPCT LEVEL	BDWDTH FACTOR
4.88585E+09	EMTR	-171.8	103.0 I	-232.7	-129.7	42.1				
8.05306E+09	RCPT	-176.1	103.0	-237.0	-134.0	42.1 I				
9.37792E+09	EMTR	-177.5	103.0 I	-238.3	-135.3	42.1				
1.61061E+10	RCPT	-182.2	103.0	-243.3	-140.0	42.1 I				
1.80000E+10	EMTR	-183.1	103.0 I	-244.0	-141.0	42.1				

INTEGRATED EMI MARGIN = 9.5

FIGURE 12 (Concluded)
SAMPLE OUTPUT - CEAR SURVEY PORT PAIR EMI SUMMARY
(Part 2 of 2)

BASELINE SYSTEM INTERFERENCE FROM TOTAL SIGNAL

ECPT -- SUBS = CNI   EQPT 1 = UHFCC PORT 2 = CCMLO   (UNCHANGED)

NOTE - R = IN REQD RANGE, I = ~~INTERPOLATED VALUE~~

FREQUENCY (HERTZ)	RECEPTOR SUSC LEVEL	EMI MARGIN	TOTAL RCVD SIGNAL
7.6800E+03	103.0	7.0	110.1
1.5360E+04	103.0	1.0	104.0
~~3.0720E+04~~	~~103.0~~	-5.0	98.0
6.1440E+04	103.0	-11.0	92.0
1.2288E+05	103.0	-14.4	88.6
2.4576E+05	103.0	-17.4	85.6
4.9152E+05	103.0	-20.4	82.7
9.8304E+05	103.0	-24.9	78.1
~~1.9661E+06~~	~~103.0~~	-30.6	72.4
3.9322E+06	103.0	-35.7	67.4
7.8643E+06	103.0	-42.2	60.8
1.5729E+07	103.0	-47.3	55.7
3.1457E+07	103.0	-51.1	51.9
6.2915E+07	103.0	-51.7	51.3
~~1.2583E+08~~	~~103.0~~	-34.7	69.3
2.5166E+08	-27.0 R	106.0	79.0
5.0332E+08	-27.0 R	96.9	63.9
1.0066E+09	103.0	-92.0	11.0
2.0133E+09	103.0	-103.3	-.3
4.0265E+09	103.0	-109.2	-6.2
~~8.0531E+09~~	103.0	-174.3	-71.3
1.6106E+10	103.0	-1103.0	-1000.0
3.2212E+10	103.0	-1103.0	-1000.0

TOTAL INTEGRATED EMI MARGIN = 35.4

FIGURE 13
SAMPLE OUTPUT - CEAR SURVEY TOTAL SIGNAL EMI

7.2.3 Trade-off and Waiver Outputs

These outputs are similar to those for the baseline EMC survey. If there was a path between a given port pair in the baseline system analysis, the baseline EMI margin and the change in the margin are also printed. If one or both ports were added or there was not path in the baseline system, the outputs are the same as for the baseline survey. The trade-off and waiver analysis outputs are illustrated in Figure 14.

7.2.4 Supplemental Outputs

TART has two types of outputs: normal and supplemental. The normal outputs, described above, do not provide information on emitter-receptor pair coupling other than the composite transfer ratio. The supplemental outputs provide additional information, but because they may be quite voluminous, these outputs are optional. These outputs are printed if the SP option is specified on the TART control card.

7.2.4.1 Antenna-to-Antenna Coupling Supplemental Outputs - The antenna coupling math model routine outputs provide information on propagation path and the factors involved in computing the path loss. The basic format, as shown in Figure 15, is used for coupling on aircraft where the wings are not in the propagation path, coupling on spacecraft, and coupling over ground. The first two parameters, ISEG and IAP, apply to antenna-to-wire and are always zero for antenna-to-antenna coupling. The next two lines give the location coordinates of the two antennas and the main beam angles. For aircraft, the cylindrical coordinates (RHO and THETA) and wing location codes, (LWA) are given. (The LWA codes are in Table 42). Following this, the antenna pattern model parameters are given. They are THO and PHO, the antenna main beam angles in radians; TH and PH, the look-angles between antennas; G, the computed antenna gain in dB; and IERR, the error code. Each of these parameters has an "X" or "R" suffix to indicate transmitting and receiving antennas, respectively.

In the next line the basic propagation parameters are given. The first four designate the propagation path, and their meanings are given in Table 130 through 132 . As an example use of this code, Figure 16 shows ISH = 10, ISHW = 0, IROX = 0, and IRO = 13. The ISH code shows that wing shading was considered but rejected because the path did not intersect the wing. (See Table 130.) ISHW and IROX are zero since there is no wing shading. (They are always zero for spacecraft and ground stations.) Parameter IRO designates the path model used. The first digit gives the relation to the vehicle body and the second digit gives the path. (See Table 132.) In this case, both antennas are on the fuselage, and the path was computed using the conical spiral model.

The other parameters on this line are: the antenna separation distance (DMIN), wing to receiver distance (DWR), free space transmission factor (TFS) the composite propagation factor (PRP), the wing shading factor (SFWP), cylindrical body factor (SFC), the transmitter antenna gain (GX), and the receiver antenna gain (GR). All propagation parameters in this line are in dB and are computed at the normalized frequency (1 GHz).

MODIFIED SYSTEM EMTR-RCPT PAIR INTERFERENCE

EMTR -- SUBS = INSPD EQPT 4 = INFYL PORT 3 = IPAX (MODIFIED)

RCPT -- SUBS = CNI EQPT 1 = UHFCO PORT 2 = COMLO (UNCHANGED)

PATH = ANT TO ANT

NOTE - R = IN RFQD RANGE, I = INTERPOLATED VALUE

				NARROWBAND					BROADBAND					
FREQUENCY (HERTZ)	FREQ BASE	TRANSFER RATIO	RECEPTOR SUSC LEV	MOD EMI MARGIN	BL EMI MARGIN	MARGIN CHANGE	MOD RCV SIGNAL	MOD EMTR SPCT LEV	MOD EMI MARGIN	BL EMI MARGIN	MARGIN CHANGE	MOD RCV SIGNAL	MOD EMTR SPCT LEV	90M FCTR
1.05376E+06	EMTR	-185.0	103.0 I	-247.6	-246.9	-.5	-144.6	-1.4						
1.53600E+06	RCPT	-185.0	103.0	-247.6	-246.9	-.8	-144.6	-1.4 I						
2.63602E+06	EMTR	-146.0	103.0 I	-247.6	-246.8	-.8	-144.6	-1.4						
3.07203E+06	RCPT	-186.0	103.0	-247.6	-246.6	-.8	-144.6	-1.4 I						
3.98795E+06	EMTR	-186.0	103.0 I	-247.6	-246.8	-.8	-144.6	-1.4						
6.14420E+06	RCPT	-186.0	103.0	-247.6	-246.8	-.8	-144.6	-1.4 I						
7.50393E+06	EMTR	-141.0	103.0 I	-242.7	-241.9	-.8	-139.7	-1.4						
1.22880E+07	RCPT	-152.9	103.0	-224.6	-223.8	-.8	-121.6	-1.4 I						
1.43973E+07	EMTR	-148.4	103.0 I	-220.0	-219.3	-.8	-117.0	-1.4						
2.45760E+07	RCPT	-139.8	103.0	-200.5	-199.7	-.8	-97.5	-1.4 I						
2.76342E+07	EMTR	-136.7	103.0 I	-197.3	-196.6	-.8	-94.3	-1.4						
4.91520E+07	RCPT	-114.7	103.0						-297.6	-238.8	11.3	-184.5	-9.8 IR	-60.0
5.30413E+07	EMTR	-113.4	103.0 I						-135.3	-158.0	12.8	-52.2	121.2 R	-60.0
9.83040E+07	RCPT	-106.9	103.0	-117.0	-37.6	-19.5	-14.0	62.8 IR	-99.5	-127.6	27.5	3.2	170.0 IR	-60.0
1.00800E+08	EMTR	-106.9	103.0 I	-36.8	-56.8	-20.0	16.2	123.1 R	-98.5	-126.7	28.2	4.5	171.4 R	-60.0
1.01500E+08	EMTR	-106.9	103.0 I	-36.7	-56.7	-20.0	16.3	123.1 R	-98.5	-126.7	28.2	4.3	171.4 R	-60.0
1.95410E+08	EMTR	-106.7	103.0 I	-36.6	-56.6	-20.0	16.4	123.1 R	-98.4	-126.5	28.2	4.6	171.4 R	-60.0
1.96608E+08	RCPT	-106.7	103.0	-36.6	-56.5	-20.0	16.4	123.1 IR	-98.4	-126.6	28.2	4.6	171.4 IR	-60.0
3.36070E+08	EMTR	-107.2	103.0 I	-37.1	-57.1	-20.0	15.9	123.1 R	-98.9	-127.1	28.2	4.1	171.4 R	-60.0
3.43216E+08	RCPT	-107.5	103.0	-37.4	-57.4	-20.0	15.6	123.1 IR	-99.1	-127.3	28.2	3.9	171.4 IR	-60.0
4.63000E+08	EMTR	-107.7	103.0 I	-47.6	-67.6	-20.0	15.4	123.1 R	-99.4	-127.5	28.2	3.5	171.4 R	-60.0
5.33320E+08	EMTR	-109.6	103.0 I						-219.4	-219.4	-.0	-116.4	53.2 R	-60.0
7.19910E+08	EMTR	-112.4	103.0 I	-132.3	-112.3	-20.0	-49.2	63.1	-107.0	-135.2	28.2	-4.3	111.4	-3.0
7.65432E+08	RCPT	-113.0	103.0	-155.6	-135.6	-20.0	-52.6	60.4 I	-110.0	-138.2	28.2	-7.0	108.7 I	-2.6
1.38150E+09	EMTR	-117.2	103.0 I	-177.1	-157.1	-20.0	-74.1	43.1	-130.5	-158.7	28.2	-27.5	91.4	-1.6
1.57286E+09	RCPT	-118.1	103.0	-178.3	-162.1	-16.2	-75.3	42.8 I	-347.5	-370.1	22.6	-244.5	-125.4 I	-1.0
2.65223E+09	EMTR	-121.2	103.0 I	-142.9	-142.1	-.8	-39.9	-1.4						
3.14573E+09	RCPT	-121.9	103.0	-133.5	-132.6	-.8	-60.5	-1.4 I						
3.39896E+09	EMTR	-123.2	103.0 I	-184.8	-154.1	-.5	-61.5	-1.4						
6.29146E+09	RCPT	-122.5	103.0	-134.2	-133.4	-.8	-51.2	-1.4 I						
9.77139E+09	EMTR	-116.3	103.0 I	-179.9	-179.1	-.8	-76.9	-1.4						
1.25829E+10	RCPT	-107.5	103.0	-137.1	-136.4	-.8	-64.1	-1.4 I						
1.47347E+10	EMTR	-93.5	23.2 IR	-76.3	-75.6	-.8	-48.2	-1.4						
2.51658E+10	RCPT	-92.1	-27.0 R	-23.7	-23.0	-.3	-53.7	-1.4 I						
3.53975E+10	EMTR	-93.2	-27.0 IR	-26.8	-26.1	-.8	-53.6	-1.4						
5.03316E+10	RCPT	-95.1	-27.0 R	-29.7	-29.0	-.8	-55.7	-1.4 I						
6.33342E+10	EMTR	-132.5	32.4 I	-123.6	-122.8	-.8	-91.2	-1.4						
1.00663E+11	RCPT	-154.0	103.0	-215.7	-214.9	-.8	-112.7	-1.4 I						
1.32322E+11	EMTR	-160.5	103.0 I	-222.1	-221.4	-.8	-119.1	-1.4						
2.01327E+11	RCPT	-164.1	103.0	-225.7	-225.0	-.3	-122.7	-1.4 I						
2.64651E+11	EMTR	-166.1	103.0 I	-227.8	-227.0	-.8	-124.8	-1.4						
4.02653E+11	RCPT	-170.1	103.0	-231.6	-231.0	-.8	-129.8	-1.4 I						

FIGURE 14
SAMPLE OUTPUT - TRADE-OFF AND WAIVER ANALYSIS
(a) PORT PAIR EMI
(Part 1 of 3)

MODIFIED SYSTEM EMTR-RCPT PAIR INTERFERENCE

EMTR -- SUBS = IMGPD EQPT 4 = INFYL PORT 3 = IPAX (MODIFIED)

RCPT -- SUBS = CNI EQPT 1 = UHFCO PORT 2 = COMLO (UNCHANGED)

PATH = ANT TO ANT (CONT D)

NOTE - R = IN REQD RANGE, I = INTERPOLATED VALUE

				NARROWBAND					BROADBAND					
FREQUENCY (HERTZ)	FREQ BASE	TRANSFER RATIO	RECEPTOR SUSC LEV	MOD EMI MARGIN	BL EMI MARGIN	MARGIN CHANGE	MOD RCV SIGNAL	MOD EMTR SPCT LEV	MOD EMI MARGIN	BL EMI MARGIN	MARGIN CHANGE	MOD RCV SIGNAL	MOD EMTR SPCT LEV	BDW FCTR
4.86635E+09	EMTR	-171.6	103.0 I	-233.4	-232.7	-.3	-133.4	41.4						
7.05306E+09	RCPT	-175.1	103.0	-237.8	-237.0	-.8	-134.8	41.4 I						
9.32742E+09	EMTR	-177.6	103.0 I	-239.1	-238.3	-.8	-136.1	41.4						
1.31061E+10	RCPT	-182.2	103.0	-243.8	-243.0	-.8	-140.8	41.4 I						
1.89100E+10	EMTR	-183.1	103.0 I	-244.8	-244.0	-.8	-141.9	41.4						

INTEGRATED EMI MARGIN = 5.4
BASELINE SYSTEM INTEGRATED EMI MARGIN = [illegible]
DIFFERENCE = -1.1

FIGURE 14 (Continued)
SAMPLE OUTPUT - TRADE-OFF AND WAIVER ANALYSIS
(a) PORT PAIR EMI
(Part 2 of 3)

MODIFIED SYSTEM INTERFERENCE FROM TOTAL SIGNAL

RCPT -- SUBS = CNI EQPT 1 = UHFCO PORT 2 = COMLO (UNCHANGED)

NOTE - R - IN RECD RANGE, I - INTERPOLATED VALUE

FREQUENCY (HERTZ)	RECEPTOR SUSC LEVEL	MOD EMI MARGIN	BL EMI MARGIN	MARGIN CHANGE	TOTAL RCVD SIG
7.6800E+03	103.0	-142.5	-142.5	-.0	-39.5
1.5360E+04	103.0	-142.6	-142.6	-.0	-39.5
~~3.0720E+04~~	~~103.0~~	~~-142.6~~	~~-142.6~~	~~-.0~~	~~-39.6~~
6.1440E+04	103.0	-142.6	-142.6	-.0	-39.6
1.2288E+05	103.0	-142.7	-142.7	-.0	-39.7
2.4576E+05	103.0	-142.8	-142.8	-.0	-39.8
4.9152E+05	103.0	-138.1	-138.2	.1	-35.1
9.8304E+05	103.0	-42.7	-42.6	-.0	60.3
~~1.9661E+06~~	~~103.0~~	~~-42.5~~	~~-42.5~~	~~-.0~~	~~60.5~~
3.9322E+06	103.0	-42.4	-42.4	-.0	60.6
7.8643E+06	103.0	-101.6	-103.1	1.5	1.4
1.5729E+07	103.0	-125.7	-127.5	1.8	-22.7
3.1457E+07	103.0	-153.0	-153.0	-.0	-50.0
6.2915E+07	103.0	-154.4	-154.4	-.0	-51.4
~~1.2583E+08~~	~~103.0~~	~~-121.4~~	~~-121.4~~	~~-.0~~	~~-18.4~~
2.5166E+08	-27.0 R	6.0	6.0	-.0	-21.0
5.0332E+08	-27.0 R	.0	.0	-.0	-27.0
1.0066E+09	103.0	-154.0	-152.4	-1.7	-51.0
2.0133E+09	103.0	-196.0	-196.0	-.0	-93.0
4.0265E+09	103.0	-127.3	-127.3	-.0	-24.3
~~8.0531E+09~~	~~103.0~~	~~-174.3~~	~~-174.3~~	~~-.0~~	~~-71.3~~
1.6106E+10	103.0	-1103.0	-1103.0	-.0	-1000.0
3.2212E+10	103.0	-1103.0	-1103.0	-.0	-1000.0

TOTAL INTEGRATED EMI MARGIN = 38.2
BASELINE SYSTEM TOTAL INTEGRATED EMI MARGIN = 38.4
~~DIFFERENCE =~~ -.2

FIGURE 14 (Concluded)

SAMPLE OUTPUT - TRADE-OFF AND WAIVER ANALYSIS
(b) TOTAL SIGNAL EMI
(Part 3 of 3)

ISEG= 0 IAP= 0

	X	Y	Z	RHO	TH	THO	PHO	[illegible]
XMTR	0.0	55.0	224.0	55.0	1.5708	0.0000	0.0000	1
RCPT	0.0	-25.0	129.0	25.0	4.7124	0.0000	0.0000	1

~~THOX,PHOX~~,THX,PHX,GX,IERR

0.00000	0.00000	2.27069	6.29319	-1.68045	0

~~THOR,PHOR~~,THR,PHR,GR,IERR

0.00000	0.00000	.87090	3.14159	-1.66038	0

ISH	ISHW	IROX	IRO	OMIN	OWR	TFS	PRP	SFWF	SFC	GX	GR
18	0	0	13	103.2	0.0	-101.2	139.2	0.0	-57.6	-1.7	-1.7

NO WING SHADING

FREQ	TFS	SFC	SFW	PRP
~~RCPT FREQS~~				
7.6800E+03	0.0	-.2	0.0	-3.6
1.6360E+04	0.0	-.3	0.0	-3.7
3.0720E+04	0.0	-.4	0.0	-3.8
6.1440E+04	0.0	-.6	0.0	-4.0
1.2288E+05	0.0	-.9	0.0	-4.2
~~2.4576E+05~~	0.0	-1.2	0.0	-4.6
4.9152E+05	0.0	-1.7	0.0	-5.1
9.8304E+05	0.0	-2.4	0.0	-5.8
1.9661E+06	0.0	-3.4	0.0	-6.8
3.9322E+06	0.0	-4.6	0.0	-8.2
7.8643E+06	0.0	-6.7	0.0	-10.1
~~1.5729E+07~~	-4.8	-9.4	0.0	-17.6
3.1457E+07	-10.8	-13.0	0.0	-27.1
6.2915E+07	-16.8	-17.8	0.0	-38.0
1.2583E+08	-22.8	-24.2	0.0	-50.4
2.5166E+08	-28.8	-32.5	0.0	-64.7
5.0332E+08	-34.9	-43.2	0.0	-81.5
~~1.0066E+09~~	-40.9	-57.7	0.0	-101.9
2.0133E+09	-46.9	-75.6	0.0	-125.8
4.0265E+09	-52.9	-96.8	0.0	-153.0
8.0531E+09	-58.9	-120.7	0.0	-181.0
1.6106E+10	-65.0	-146.3	0.0	-214.6
3.2212E+10	-71.0	-172.0	0.0	-245.4
~~XMTR FREQS~~				
6.8303E+03	0.0	-.2	0.0	-3.6
1.6607E+04	0.0	-.3	0.0	-3.7
3.1233E+04	0.0	-.4	0.0	-3.8
5.8739E+04	0.0	-.6	0.0	-4.0
1.1047E+05	0.0	-.8	0.0	-4.2
~~2.0776E+05~~	0.0	-1.1	0.0	-4.5
3.9073E+05	0.0	-1.5	0.0	-4.9
7.3485E+05	0.0	-2.1	0.0	-5.5
1.3820E+06	0.0	-2.9	0.0	-6.2
2.5991E+06	0.0	-3.9	0.0	-7.3
4.8882E+06	0.0	-5.3	0.0	-8.7
~~9.1932E+06~~	-.1	-7.3	0.0	-10.7
1.7290E+07	-5.6	-9.8	0.0	-19.7
3.2516E+07	-11.1	-13.2	0.0	-27.6
5.1153E+07	-16.5	-17.6	0.0	-37.5
1.1501E+08	-22.0	-23.3	0.0	-46.7
2.1630E+08	-27.5	-30.5	0.0	-61.4
~~4.0679E+08~~	-33.0	-39.4	0.0	-75.8
7.6504E+08	-38.5	-51.6	0.0	-93.4
1.0380E+09	-41.1	-56.2	0.0	-102.7
1.0900E+09	-41.6	-59.6	0.0	-104.5
1.4380E+09	-44.0	-66.5	0.0	-113.8
2.7060E+09	-49.5	-84.2	0.0	-137.1

FIGURE 15
SAMPLE ANTENNA-TO-ANTENNA COUPLING SUPPLEMENTAL OUTPUT
BASIC FORMAT

```
 ISEG=  0  IAP=  0
              X          Y          Z          RHO          TH      THO      PHO      LWA
XMTR       81.5      -46.0      210.0         93.1     5.7787  1.7453  0.0000       2
RCPT        0.0      113.0      625.0        113.0     1.5708  0.0000  0.0000       1


 THOX,PHOX,THX,PHX,GX,IERR
   1.74533   0.00000   1.44169    3.17766 -20.00000  0
 THOR,PHOR,THR,PHR,GR,IERR
   0.00000   0.00000   2.17801     .41266  -1.46466  0


 THOX,PHOX,THX,PHX,GX,IERR
   1.74533   0.00000    .76060    4.19732 -20.00000  0
 THOR,PHOR,THR,PHR,GR,IERR
   0.00000   0.00000   1.87328     .13664  -7.62128  0
------------------------------
       ISH ISHW IROX  IRO     DMIN      DWR     TFS     PRP     SFWP     SFC     GX     GR
         7    2    0   31     49.3    403.6   -76.5   145.6     75.0    -4.0  -20.0   -1.5

       ISH ISHW IROX  IRO     DMIN      DWR     TFS     PRP     SFWP     SFC     GX     GR
         7    1   40   41    255.1    223.6   -87.8   131.3     71.9     -.0  -20.0   -1.5
------------------------------
                           FORWARD EDGE                                AFT EDGE
   FREQ            TFS     SFC     SFW      PRP           TFS     SFC     SFW      PRP       PROP
 RCPT FREQS
 7.6800E+03        0.0     -.0     0.0    -21.5           0.0     -.0     0.0    -27.6      -21.5
 1.5360E+04        0.0     -.0     0.0    -21.5           0.0     -.0     0.0    -27.6      -21.5
 3.0720E+04        0.0     -.0     0.0    -21.5           0.0     -.0     0.0    -27.6      -21.5
 6.1440E+04        0.0     -.0     0.0    -21.5           0.0     -.0     0.0    -27.7      -21.5
 1.2288E+05        0.0     -.0     0.0    -21.5           0.0     -.0     0.0    -27.7      -21.5
 2.4576E+05        0.0     -.0     0.0    -21.5           0.0     -.1     0.0    -27.7      -21.5
 4.9152E+05        0.0     -.0     0.0    -21.5           0.0     -.1     0.0    -27.7      -21.5
 9.8304E+05        0.0     -.0     0.0    -21.5           0.0     -.1     0.0    -27.7      -21.5
 1.9661E+06        0.0     -.0     0.0    -21.5           0.0     -.2     0.0    -27.8      -21.5
 3.9322E+06        -.6     -.0     0.0    -22.1           0.0     -.3     0.0    -27.9      -22.1
 7.8643E+06       -6.6     -.0     0.0    -28.1           0.0     -.4     0.0    -28.0      -28.0
 1.5729E+07      -12.6     -.0     -.1    -34.2           0.0     -.5     0.0    -28.1      -28.1
 3.1457E+07      -18.6     -.0    -3.1    -43.2          -4.3     -.7     0.0    -32.7      -32.7
 6.2915E+07      -24.7     -.0    -6.1    -52.3         -10.4    -1.0     0.0    -39.0      -39.0
 1.2583E+08      -30.7     -.0    -9.1    -61.3         -16.4    -1.4    -2.0    -47.4      -47.4
 2.5166E+08      -36.7     -.0   -12.1    -70.3         -22.4    -2.0    -5.0    -57.1      -57.1
 5.0332E+08      -42.7     -.0   -15.2    -79.4         -28.4    -2.9    -8.0    -66.9      -66.9
 1.0066E+09      -48.7     -.0   -18.2    -88.4         -34.5    -4.0   -11.0    -77.1      -77.1
 2.0133E+09      -54.8     -.0   -21.2    -97.4         -40.5    -5.6   -14.0    -87.7      -87.7
 4.0265E+09      -60.8     -.0   -24.2   -106.4         -46.5    -7.8   -17.1    -99.0      -99.0
 8.0531E+09      -66.8     -.0   -27.2   -115.5         -52.5   -10.9   -20.1   -111.1     -111.1
 1.6106E+10      -72.8     -.0   -30.2   -124.5         -58.5   -15.0   -23.1   -124.3     -124.3
 3.2212E+10      -78.8     -.0   -33.2   -133.5         -64.5   -20.6   -26.1   -138.8     -133.5
 EMTR FREQS
 1.0600E+04        0.0     -.0     0.0    -21.5           0.0     -.0     0.0    -27.6      -21.5
 2.0360E+04        0.0     -.0     0.0    -21.5           0.0     -.0     0.0    -27.6      -21.5
 3.9080E+04        0.0     -.0     0.0    -21.5           0.0     -.0     0.0    -27.6      -21.5
 7.5009E+04        0.0     -.0     0.0    -21.5           0.0     -.0     0.0    -27.7      -21.5
 1.4397E+05        0.0     -.0     0.0    -21.5           0.0     -.0     0.0    -27.7      -21.5
 2.7634E+05        0.0     -.0     0.0    -21.5           0.0     -.1     0.0    -27.7      -21.5
 6.3041E+05        0.0     -.0     0.0    -21.5           0.0     -.1     0.0    -27.7      -21.5
 1.0800E+06        0.0     -.0     0.0    -21.5           0.0     -.1     0.0    -27.8      -21.5
 1.0181E+06        0.0     -.0     0.0    -21.5           0.0     -.1     0.0    -27.8      -21.5
 1.9541E+06        0.0     -.0     0.0    -21.5           0.0     -.2     0.0    -27.8      -21.5
 3.7507E+06        -.2     -.0     0.0    -21.6           0.0     -.2     0.0    -27.9      -21.6
 4.0800E+06        -.7     -.0     0.0    -22.2           0.0     -.3     0.0    -27.9      -22.2
 5.8C80E+06       -2.7     -.0     0.0    -24.1           0.0     -.3     0.0    -27.9      -24.1
 7.1991E+06       -5.8     -.0     0.0    -27.3           0.0     -.3     0.0    -28.0      -27.3
```

FIGURE 16

SAMPLE ANTENNA-TO-ANTENNA COUPLING SUPPLEMENTAL OUTPUT WITH WING SHADING

Finally, tables of the transfer ratio (PRP) and its three components, free space transmission (TFS), cylindrical shading factor (SFC), and wing shading factor (SFW) are printed (in dB) at all receptor and emitter frequencies common to the two ports. PRP does not include the effects of filters connected to the ports.

If the system is an aircraft and the path between antennas include wing shading, an output such as shown in Figure 16 is printed. Propagation path losses are computed around both forward and aft edges of the wing and the minimum total loss is used. This output is similar to that for the no wing shading case, except that parameters are given for both paths (the aft wing edge is given first). In this case, DMIN is the transmitter antenna-to-wing distance, and DWR is the wing-to-receiver antenna distance. The propagation parameters for both wing edges are given at each frequency as well as the composite transfer ratio used (PROP).

7.2.4.2 Antenna-to-Wire Coupling Supplemental Outputs - This output, as illustrated in Figure 17, is similar to the antenna-to-antenna output described above. One such output is printed per aperture exposing the receptor wire.

The wire segment number (ISEG) and aperture number (IAP) are printed first. The antenna location, transmitter antenna gain, and propagation parameter outputs are the same as for antenna-to-antenna except the receiver antenna is replaced by the exposing aperture.

The parameters comprising the transfer ratio from emitter output to the receptor load (except filter factors) are given at each frequency. This transfer consists of two models. The first model uses the shading factors (SFC and SFW) combined with the free space loss to give the ratio of the aperture E-field to antenna input (PRP) in dB. (PRPA is the numeric ratio equivalent of PRP.) The second model computes the E-field-to-wire load ratio (AWRTO). These are combined using the load admittances (YE and YR) to compute the complete path transfer ratio (TRNDSF). If the wire has multiple exposures, superposition is used to compute the total transfer, and TRNSF contains this total.

7.2.4.3 Wire-to-Wire Coupling Supplemental Outputs - This output, which is illustrated in Figure 18, provides the capacative (XFERV) and inductive (XFERI) components of the transfer ratio at each frequency. (The emitter frequencies are printed first.) One such output is provided for each bundle segment common to the wires connected to the emitter and receptor ports. The final transfer function is the sum of all these components converted to dB plus the filter factors, if any.

ISEG= 1 IAP= 2

	X	Y	Z	RHO	TH	THO	PHO	LWA
XMTR	0.0	55.0	374.0	55.0	1.5708	0.0000	0.0000	1
RCPT	0.0	77.2	332.5	52.2	1.5708	0.0000	0.0000	1

THOX,PHOX,THX,PHX,GX,IERR
0.00000 0.00000 1.63816 6.28319 -17.86000 0

ISH	ISHW	IROX	IRO	OMIN	DWR	IFS	PRP	SFWF	SFG	GX	GR
0	0	0	0	41.6	0.0	-73.6	114.4	0.0	0.0	-17.9	0.0

FREQ	SFC	SFW	PRP	PRPA	AWRTO	YE	YR	TRNSF
RCPT FREQS								
7.6800E+03	0.0	0.0	-3.6	.0	1.3974E-05	2.0000E-02	2.0000E+00	1.7165E-08
1.5360E+04	0.0	0.0	-3.6	.0	2.7948E-05	2.0000E-02	2.0000E+00	6.8653E-08
~~3.0720E+04~~	0.0	0.0	-3.6	.0	5.5896E-05	2.0000E-02	2.0000E+00	2.7465E-07
6.1440E+04	0.0	0.0	-3.6	.0	1.1179E-04	2.0000E-02	2.0000E+00	1.0986E-06
1.2288E+05	0.0	0.0	-3.6	.0	2.2358E-04	2.0000E-02	2.0000E+00	4.3945E-06
2.4576E+05	0.0	0.0	-3.6	.0	4.4716E-04	2.0000E-02	2.0000E+00	1.7578E-05
4.9152E+05	0.0	0.0	-3.6	.0	8.9433E-04	2.0000E-02	2.0000E+00	7.0311E-05
9.8304E+05	0.0	0.0	-3.6	.0	1.7867E-03	2.0000E-02	2.0000E+00	2.8125E-04
~~1.9661E+06~~	0.0	0.0	-3.6	.0	3.5773E-03	2.0000E-02	2.0000E+00	1.1250E-03
3.9322E+06	0.0	0.0	-3.6	.0	7.1546E-03	2.0000E-02	2.0000E+00	4.4999E-03
7.8643E+06	0.0	0.0	-3.6	.0	1.4309E-02	2.0000E-02	2.0000E+00	1.8000E-02
1.5729E+07	0.0	0.0	-3.6	.1	2.6619E-02	2.0000E-02	2.0000E+00	7.1933E-02
3.1457E+07	0.0	0.0	-3.6	.3	5.7237E-02	2.0000E-02	2.0000E+00	2.8799E-01
6.2915E+07	0.0	0.0	-3.6	.2	4.6987E-02	2.0000E-02	2.0000E+00	2.1015E-01
~~1.2583E+08~~	0.0	0.0	-3.6	.1	2.9251E-02	2.0000E-02	2.0000E+00	7.5219E-02
2.5166E+08	0.0	0.0	-3.6	.1	2.9251E-02	2.0000E-02	2.0000E+00	7.5219E-02
5.0332E+08	0.0	0.0	-3.6	.1	2.9251E-02	2.0000E-02	2.0000E+00	7.5219E-02
EMTR FREQS								
1.1969E+04	0.0	0.0	-3.6	.0	2.1778E-05	2.0000E-02	2.0000E+00	4.1630E-08
2.5303E+04	0.0	0.0	-3.6	.0	4.6039E-05	2.0000E-02	2.0000E+00	1.8833E-07
~~5.3492E+04~~	0.0	0.0	-3.6	.0	9.7330E-05	2.0000E-02	2.0000E+00	8.3276E-07
1.1309E+05	0.0	0.0	-3.6	.0	2.0576E-04	2.0000E-02	2.0000E+00	3.7216E-06
2.3907E+05	0.0	0.0	-3.6	.0	4.3499E-04	2.0000E-02	2.0000E+00	1.6634E-05
5.0540E+05	0.0	0.0	-3.6	.0	9.1959E-04	2.0000E-02	2.0000E+00	7.4339E-05
1.0685E+06	0.0	0.0	-3.6	.0	1.9441E-03	2.0000E-02	2.0000E+00	3.3274E-04
2.2588E+06	0.0	0.0	-3.6	.0	4.1099E-03	2.0000E-02	2.0000E+00	1.4649E-03
~~4.7752E+06~~	0.0	0.0	-3.6	.0	8.6885E-03	2.0000E-02	2.0000E+00	6.6302E-03
1.0095E+07	0.0	0.0	-3.6	.0	1.8358E-02	2.0000E-02	2.0000E+00	2.9659E-02
2.1341E+07	0.0	0.0	-3.6	.1	3.8831E-02	2.0000E-02	2.0000E+00	1.3255E-01
4.5117E+07	0.0	0.0	-3.6	.4	5.6311E-02	2.0000E-02	2.0000E+00	4.1072E-01
9.5380E+07	0.0	0.0	-3.6	.1	3.2313E-02	2.0000E-02	2.0000E+00	9.1707E-02
2.0164E+08	0.0	0.0	-3.6	.1	2.9251E-02	2.0000E-02	2.0000E+00	7.5219E-02
~~4.2627E+08~~	0.0	0.0	-3.6	.1	2.9251E-02	2.0000E-02	2.0000E+00	7.5219E-02
8.0000E+08	0.0	0.0	-3.6	.1	2.9251E-02	2.0000E-02	2.0000E+00	7.5219E-02

FIGURE 17

SAMPLE ANTENNA-TO-WIRE COUPLING SUPPLEMENTAL OUTPUT

ICEMIT	ICRECP	ILEMIT	ILRECP	IWTYPE	IWTYPR
2	1	1	1	2	1

IEENOS	IRENOS	IMGMGE	IBALTP
0	0	0	0

FREQUENCY	XFERV	XFERI
3.00000E+01	1.15989E-08	2.66499E-03
6.34217E+01	2.43911E-08	5.38444E-03
1.34077E+02	5.11685E-08	1.03347E-02
~~2.83447E+02~~	~~1.06769E-07~~	1.63409E-02
5.99222E+02	2.22487E-07	1.88021E-02
1.26679E+03	4.59353E-07	1.54947E-02
2.67807E+03	9.38284E-07	9.38089E-03
5.66169E+03	1.88697E-06	4.77718E-03
1.19689E+04	3.71020E-06	2.30063E-03
2.53030E+04	7.06057E-06	1.09272E-03
5.34919E+04	1.28172E-05	5.17357E-04
1.13085E+05	2.17428E-05	2.44773E-04
2.39068E+05	3.35001E-05	[illegible]
5.05404E+05	4.51926E-05	[illegible]
1.06845E+06	5.14950E-05	[illegible]
2.25877E+06	5.03241E-05	[illegible]
4.77517E+06	5.24512E-05	5.79703E-06
1.00950E+07	8.12381E-05	2.74213E-06
2.13414E+07	1.64038E-04	1.29710E-06
4.51169E+07	3.46002E-04	6.13557E-07
9.53796E+07	7.31071E-04	2.90227E-07
3.00000E+01	1.15989E-08	2.66499E-03
6.00000E+01	2.30859E-08	5.11332E-03
1.20000E+02	4.58572E-08	9.45925E-03
2.40000E+02	9.08321E-08	1.51353E-02
4.80000E+02	1.79198E-07	1.85753E-02
9.60000E+02	3.51536E-07	1.73134E-02
1.92000E+03	6.64134E-07	1.20972E-02
3.84000E+03	[illegible]	6.86203E-03
7.68000E+03	2.49322E-06	3.55677E-03
1.53600E+04	4.61696E-06	[illegible]
3.07200E+04	8.28359E-06	[illegible]
6.14400E+04	1.42169E-05	4.50453E-04
1.22880E+05	2.29336E-05	2.25264E-04
2.45760E+05	3.39604E-05	1.12636E-04
4.91520E+05	4.48194E-05	5.63186E-05
9.83040E+05	5.12044E-05	2.81593E-05
1.96608E+06	5.08374E-05	1.40797E-05
3.93216E+06	5.03089E-05	7.03984E-06
7.86432E+06	6.71021E-05	3.51992E-06
1.57286E+07	1.21722E-04	1.75996E-06
3.14573E+07	2.41320E-04	8.79980E-07
6.29146E+07	4.62414E-04	4.39990E-07
1.25829E+08	9.63986E-04	2.19995E-07
2.51658E+08	1.92129E-03	1.09996E-07

FIGURE 18

SAMPLE WIRE-TO-WIRE COUPLING SUPPLEMENTAL OUTPUT

Section 8

ERROR CONDITIONS

8.1 IDIPR ERRORS

If the Input Decode and Initial Processing Routine is used to process a new system, it is likely that errors will be encountered in the input data, particularly if the user has little experience with the program or if the system is a large one. These errors will probably be in the nature of missing parameters, incorrect syntax, or insufficient data. The program is designed to print out an error diagnostic when an error is encountered and then to continue processing the data. The errors are, therefore, treated as "non-fatal" errors, in that they do not cause the program to abort, but the program must be run again after the errors have been corrected. It is possible that further errors will be encountered in some of the equipment data previously skipped, but the number of runs needed to debug the input will be far less than if the program aborted automatically when an error was encountered. If errors are encountered in decoding the input data, processing will halt after all the input data has been processed and before entering the second phase of IDIPR, which performs file updates and generates initial spectra. The user can override this halt and continue into the file update and initial spectrum generation. However, additional errors may result from errors flagged in the input data.

There are fifty-eight program detectable errors in IDIPR, of which only three are fatal: the maximum number of equipments exceeded, an EXEC card not given first, or an ISF spectrum ID record not matching a port. A description of IDIPR errors is given in Table 160.

8.2 TART ERRORS

After the input data is processed by IDIPR, it is possible that there are still errors in the input that could not be detected by IDIPR. An example of this type of error would be a specified component that did not exist, such as a port-associated antenna ID that cannot be matched in the antenna data. Such errors that can be detected by TART cause an error diagnostic to be printed out. The program does not abort when such errors are detected, so that other errors can be located without having to repeatedly re-run the program. Errors that do abort a run are an invalid task control, invalid task code, file alignment errors, invalid system type code, or a zero fuselage radius for a spacecraft.

A description of TART errors is given in Table 161.

TABLE 160

IDIPR ERRORS

ERROR NUMBER	FATAL/ NON-FATAL	DESCRIPTION
1	NF	No match for keyword - use a legitimate keyword
2	NF	Missing equal sign
3	NF	No match for alpha code - check list of acceptable alpha codes (see Table 60)
4	NF	Number of parameters is incorrect
5	NF	Illegal syntax
6	NF	Alphanumeric must begin with alpha
7	NF	Invalid ID syntax - check the input rules (section 6.1.3)
8	NF	Mismatched parenthesis
9	NF	Number of values for inner environmental field, outer environmental field and frequency must be the same
10	NF	Multiple card of the same type
11	NF	Index equals zero or exceeds the maximum
12	NF	Card is out of order
13	NF	Illegal S/R code - check input rules (section 6.1.3)
14	NF	Missing hierarchy data - check input rules (section 6.1.3)
15	NF	Incomplete equipment or bundle data
16	NF	Wrong MOD code for job type - check input rules (section 6.1.4)
17	NF	MOD code conflict - check input rules (section 6.1.4)
18	NF	All (M) and (D) must precede ADDS
19	NF	ID of system component to be deleted cannot be found

TABLE 160 (Continued)

ERROR NUMBER	FATAL/ NON-FATAL	DESCRIPTION
20	NF	ID of antenna connected to a port cannot be found in system data
21	NF	ID of bundle associated with a wire port cannot be found in system data
22	NF	ID of wire connected to port cannot be found in system data
23	NF	The first port of an equipment must be equipment case
24	NF	The frequency table has an error - check frequencies in table
25	NF	Number of ports for equipment is less than one or greater than fifteen
26	NF	SOURCE/RECEPTOR card for port is missing
27	NF	There was an error in initial spectrum generation
28	NF	Number of equipments exceeds the maximum
29	NF	Bundle/wire ID cannot be found in system data. If bundle and wire ID are not in error, look for error in system data.
30	NF	T1 and RE must be in columns 1-2
31	NF	Invalid initial spectrum option - check input rules
32	NF	Invalid spectrum request to SPCMDL
33	NF	Invalid receptor port SR code index
34	NF	Invalid source port SR code index
35	NF	Source and receptor SR codes must be the same for the same port
36	NF	The load impedance is zero - must put in a finite load impedance for a port
37	NF	Electro-explosive device may not be entered as a source, only as a receptor

TABLE 160 (Continued)

ERROR NUMBER	FATAL/ NON-FATAL	DESCRIPTION
38	NF	The specification option for a power line has an invalid index
39	NF	The modulation code for a source or receptor has an invalid index
40	NF	The AM modulation index must be between zero and one
41	NF	The signal type code has an invalid index
42	NF	The SR code has a bad index when entering subroutine SCARFE
43	NF	The stated pulse width of a wave form exceeds the pulse separation
44	NF	MIL-STD-461A may not be specified for an EED
45	NF	Bad specified RF power level was detected by subroutine M461
46	NF	MIL-STD-704 may not be specified for a power line receptor
47	NF	MIL-STD-6181 may not be specified for an EED
48	NF	Duplicate ID
49	NF	Bundle segment point ID is not defined in list of bundle points
50	NF	Wire point ID is not defined in list of bundle points
51	NF	Port bundle point connection is not a legitimate wire point
52	NF	Wire type ID cannot be found in wire characteristics table
53	NF	Bundle segment point indices are identical or invalid - put in correct bundle points defining the segment
54	NF	A wire either has more than ten segments or it loops on itself. If less than ten segments, ensure that wire cannot form a loop

TABLE 160 (Concluded)

ERROR NUMBER	FATAL/ NON-FATAL	DESCRIPTION
55	NF	The end of a wire does not connect to any port
901	F	The Intrasystem File spectra ID record does not match port
902	F	EXEC card must precede all data cards except TITLE and REMARKS
903	F	Maximum number of equipments has been exceeded

TABLE 161

TART ERRORS

ERROR NUMBER	FATAL/ NON-FATAL	SUBROUTINE	DESCRIPTION
1	F	TART	Invalid task code (IRUN)
2	F	PAREAD	Invalid tart control card
3	F	PAREAD	Invalid task code on tart control card
4	F	PAREAD	Initial processing and TART tasks incompatible (change task code to agree with IDIPR task)
101	F	CEAR	File alignment error between baseline trans file and rcpt spectrum file
102	F	CEAR	Baseline transfer file alignment error. End-of-emtrs not read when expected for this receptor and no ports were added. (Probable cause: deleted port during trade-off analysis)
103	F	CEAR	File alignment error between baseline trans file and rcpt spectrum file
104	F	CEAR	Emtr spectra file alignment error. Unexpected end-of-file during waiver analysis or trade-off with spectrum changes only.
201	F	SGR	File alignment error between scratch trans file and adjusted emtr spectra files. Unexpected end-of-file.
301	F	RCPTRD	File alignment error between rcpt equipment and spectra working files. Eqpt indices do not match.
302	F	RCPTRD	File alignment error between rcpt equipment and spectra working files. Subsystem, equipment, and port ID's do not match.
303	F	RCPTRD	Invalid change code. (Probable cause: deleted port for trade-off analysis.)
401	F	EMTRD	File alignment error. Same as 301 except for emtr.
402	F	EMTRD	File alignment error. Same as 302 except for emtr.

TABLE 161 (Continued)

ERROR NUMBER	FATAL/ NON-FATAL	SUBROUTINE	DESCRIPTION
403	F	EMTRD	File alignment error. Same as 303 except for emtr
501	NF	COUPLE	Bundle ID specified by port cannot be found in wire bundle data.
502	NF	COUPLE	Bundle file alignment error. Bundle index in port data does not match the wire map file index for same bundle ID.
503	NF	COUPLE	Wire ID specified for emitter port cannot be found in wire bundle data.
504	NF	COUPLE	Wire ID specified for rcpt port cannot be found in wire bundle data.
505	NF	COUPLE	Filter ID specified for emtr port cannot be found in filter data.
506	NF	COUPLE	Filter ID specified for rcpt port cannot be found in filter data.
601	NF	ACTFER	Invalid path code
602	NF	ACTFER	Antenna ID specified for rcpt port cannot be found in antenna data.
603	NF	ACTFER	Aperture ID specified for rcpt wire segment cannot be found in aperture data.
604	NF	ACTFER	Antenna ID specified for emtr port cannot be found in aperture data.
605	NF	ACTFER	Wire characteristics table ID specified for rcpt wire cannot be found in table.
701	NF	GAIN	Bad antenna orientation. Angles outside allowable ranges: $0 \le \theta_o \le 180°$ and $0 \le \phi_o \le 360°$
702	NF	GAIN	Bad antenna look angles. Angles outside allowable ranges: $0 \le \theta \le 180°$ and $0 \le \phi \le 360°$
703	NF	GAIN	Bad antenna vertical half-beamwidth. Outside allowable range: $0 \le \theta_B \le 90°$

TABLE 161 (Continued)

ERROR NUMBER	FATAL/ NON-FATAL	SUBROUTINE	DESCRIPTION
704	NF	GAIN	Bad antenna horizontal half-beamwidth. Outside allowable range: $0 \leq \phi_B \leq 180°$
705	NF	GAIN	Bad antenna sidelobe half-beamwidth. Outside allowable range: $0 \leq \phi_{SR} \leq 180°$
801	F	VERSET	Invalid system type code - called
802	F	VERSET	Zero fuselage radius specified for spacecraft
901	NF	WTWTFR	Subscript for emitter wire ID in wire characteristics table out of range
902	NF	WTWTFR	Subscript for receptor wire ID in wire characteristics table out of range
903	NF	WTWTFR	Code for emitter shield configuration out of range
904	NF	WTWTFR	Code for receptor shield configuration out of range
905	NF	WTWTFR	Code for emitter twist/untwist configuration out of range
906	NF	WTWTFR	Code for receptor twist/untwist configuration out of range
907	NF	WTWTFR	Code for emitter balance/unbalance configuration out of range
908	NF	WTWTFR	Code for receptor balance/unbalance configuration out of range
909	NF	WTWTFR	Code for emitter right/left identification out of range
910	NF	WTWTFR	Code for receptor right/left identification out of range
911	NF	WTWTFR	Code for emitter end or internal segment out of range
912	NF	WTWTFR	Code for receptor end or internal segment out of range

TABLE 161 (Concluded)

ERROR NUMBER	FATAL/ NON-FATAL	SUBROUTINE	DESCRIPTION
913	NF	WTWTFR	Zero emtr wire load admittance
914	NF	WTWTFR	Zero rcpt wire load admittance
1001	NF	FILTER	Invalid filter type
1002	NF	FILTER	Invalid filter Q or coupling coefficient
1101	NF	ENVIRN	Antenna ID specified for rcpt port cannot be found in antenna data
1102	NF	ENVIRN	Wire type ID specified for rcpt port cannot be found in wire characteristics table
1103	NF	ENVIRN	Aperture ID specified for rcpt wire cannot be found in aperture data
1104	NF	ENVIRN	Filter ID specified for rcpt port cannot be found in filter data

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